TANGANYIKA

Annual Report
of the
Department of Agriculture
1955

PART I

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TANGANYIKA

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, 1955

Part I

I.—POLICY AND GENERAL REVIEW

Nineteen-fifty-five will be remembered as the year in which the Report of the Royal Commission on Population and Land was published, and in consequence agricultural thought was strongly coloured by the general tenor of its arguments. Many of the conclusions reached by the Commissioners did not come as a surprise, since they closely followed themes which had been developing locally.

Publication, however, provided an impetus for initiating some of the important changes of policy which took place during the year.

2. The change which is likely to have the most valuable long-term effects was the creation of the post of Assistant Director (Research). This officer assumed duty in October and has, as his main task, the formulation of a basic plan on which the annual research programme for stations throughout the Territory can be founded and inter-related. The primary aim of the plan is to find a solution, or solutions, to the problem of maintaining soil fertility under intensive systems of agriculture in tropical conditions, for without this knowledge it will be impossible to bring about the change from shifting cultivation to individual smallholdings with any degree of confidence in the future. Apart from the sisal and coffee research stations, the remainder are to be reorganized on a regional basis with a main station served by a chain of sub-stations in each of four regions. This arrangement should cover effectively the very wide range of ecological conditions which have to be considered, and should provide more readily for specialist advice to farmers in all important agricultural districts. It is unfortunate that shortage of funds is likely to necessitate a slow implementation of this policy, but it is thought that a sound framework has been laid.

3. The Assistant Director of Agriculture (Research) will also be responsible for keeping in much closer contact with research work in the other East African territories than was previously possible for the Director with his other multifarious duties. He will assist in co-ordinating the total research effort, and it will be up to him to ensure that all officers of the Department are kept fully informed of any important results which may be obtained.

4. Another sphere in which a change of emphasis has been planned is that of soil conservation. The superscale post of Chief Soil Conservation Officer was abolished on the grounds that all Agricultural Officers who rise to provincial responsibility should now be sufficiently experienced in soil conservation methods not to need outside technical advice and guidance on the subject. The mechanical units again worked at a loss and there was delay in payment of bills, so their fate is in the balance, but the farm planning side is to be developed. At the same time regional land use planning teams are to be formed as funds and staff

become available. Their function will be twofold: primarily they will be required for the ecological survey and selection of new settlement areas, but it is expected that before long they will also be in demand for re-planning settled African areas prior to the grant of titles.

5. Nineteen-fifty-five saw the end of the Crops (Increased Production) Ordinance, under which farmers of alienated land could obtain a guaranteed minimum return for specified crops. For the last five years, only wheat and maize were covered by the planting orders which formed the basis on which claims were made. As a war-time, self-sufficiency measure the Ordinance played a useful part in enabling farmers to work marginal land without loss, and the District Production Committees formed under its provisions have proved a very valuable means of bringing farmers together and crystallizing local opinion. Recently, however, there is no doubt that the guaranteed minimum return has been responsible for an appreciable amount of marginal farming and it has also come to be used, quite unintentionally, as a basis for granting short-term credit. These facilities will be missed by the farming community, but it is felt that subsidisation of this nature, coupled with a strong inducement towards monocropping, can no longer be justified.

6. The compulsory sale of maize and rice at fixed prices to Government or its agents also came to a close at the end of 1955, and these commodities will now be handled by private enterprise. During the next two years of transition, however, Government will offer a "support" price for maize, which is expected to be approximately equivalent to its export value. Critics who have for some time been advocating a return to a free economy should now be satisfied, but it may not perhaps be fully realized what a heavy burden of responsibility, both to consumers and producers, has to be carried by an efficient grain marketing organization.

7. Two important developments occurred in the sphere of mechanization. In the Lake Province scheme, financed by the Lint and Seed Marketing Board, the commercial ploughing units were firmly separated from the experimental side; they were put on a more accurate cost accounting basis, and to judge from their increased popularity during the cultivation season they stand a good chance of making a small profit. The experimental side was used as a foundation on which to build an agricultural engineering research unit with its own staff, and a very promising start has been made. On the other side of the Territory, the Rufiji ploughing scheme suffered a severe setback through groups of cultivators clubbing together and buying their own machinery. Although most of these groups will probably be disillusioned by the inherent difficulties of their enterprise and may go bankrupt, the break-away must be read as a sign of the times and an indication of the unfolding of African self-reliance, to which ever-increasing attention and encouragement must be given when planning extension work in the future.

8. A serious check to extension work generally occurred in the Uluguru Mountains in the middle of the year, when organized resistance to soil conservation measures coupled with political activity led to rioting, and active work on the scheme had to be temporarily suspended. The incident brought to light certain weaknesses in extension technique, even though it took place in the home of the "bush school" method of approach.

9. On the education front a most important review of current methods in primary and middle school gardens was undertaken, and revised curricula were drawn up in accordance with the recommendations made. Full implementation of the new proposals will not be possible until more trained teachers are available, but an attempt to break this bottle-neck was made by freeing more teacher vacancies at Ukiriguru and by concentrating their course into one year's work.

10. Towards the end of the year, the first steps were taken to place some of the responsibility for animal husbandry upon the Department of Agriculture. The guiding principle which was accepted is that land must be used as an organic whole, and that land use planning must be fully integrated in all its aspects, a task in which all "Agriculture and Natural Resources" Departments have an essential part to play. The full implications of this change have yet to be worked out and it is too early to report on progress.

II.—GENERAL REVIEW OF THE CROP SEASON

Although the rains were below average in amount, they were generally well distributed. Harvests were good for both food and cash crops, there being very few failures, and records were broken in many places, particularly with maize, rice and, in the Lake Province, cotton. Maize was sold in Pare and Lushoto Districts where none has been marketed since the early thirties. Even the Central Province reaped ample harvests and the only crops which failed were legumes, which are traditionally planted late. It was particularly fortunate that the heavy Desert Locust invasions at a critical time were controlled and no damage to crops was done.

2. These satisfactory harvests soon checked the food shortages which were inherited early in the year from 1954. The failure of the 1954/55 short rains aggravated two major shortages which followed the disappointing long rains. In Bagamoyo District, cassava had to be imported from Uzaramo, and relief from Native Authority stores was necessary in Handeni. Relief measures for the Ugogo famine, which was the only other major shortage, ended in April and some families subsequently reaped enough food for two years.

3. Although in general the season was satisfactory, there were local difficulties in some Provinces. The distribution of rain was poor in the Lake Province, for there were heavy showers with long dry spells between, and only drought-resistant crops such as cotton and sorghum were a success. The distribution of the rains was unusual in the Southern Province, where they started so late and persisted for so long that yields of all crops except oil-seeds were reduced by cold and wet. In particular the sorghum crop failed in the Mbwemkuru valley. The long rains failed in parts of the Northern Province, principally in the more marginal non-native farming areas at Oljoro, Essimingor and Babati, and large sums were paid out in guaranteed minimum returns for maize. Similarly, so little rain fell in the Lake Rukwa area that the lake level fell and the fisheries season was poor.

4. Lastly, there were some serious outbreaks of pests and diseases. Rust ruined a promising wheat crop in the Northern Province, and *Jassid*, rat plagues and bollworm reduced a very promising cotton crop in the Southern and Eastern Provinces.

5. Despite these shortcomings, the general picture is of ample food in the Territory, with big surpluses of maize and rice, and of most other crops. The isolated local food shortages will easily be met by barter within the areas affected.

6. Rainfall figures for the 1954/55 season at representative stations in the Territory are as follows:—

	1954/55 Ins.	Previous average Ins.	
Morogoro, Eastern Province	31·44	34·91	
Dodoma, Central Province	20·0	22·51	
Tabora, Western Province	30·74	34·66	
Mwanza, Lake Province	33·12	35·95	
Mbeya, S. Highlands Province	34·28	35·54	
Arusha, Northern Province...	—	—	
Lushoto, Tanga Province	38·51	42·32	
Lindi, Southern Province (1955)	43·13	35·98	(Annual)

III.—MARKETING AND GRADING OF PRODUCE

Foodstuffs

Only the purchase of wheat, maize and paddy remained under Government control in 1955. At the end of 1954 sorghum was removed from control, but the Grain Storage Department still offered a guaranteed price of Shs. 30/- per 200 lb. (naked) for true white varieties to those producers who could not sell more profitably through normal trading channels. Basic guaranteed prices were as follows:—

Shillings per 200 lb. unbagged	1952	1953	1954	1955
Wheat, Grade I	45/35	52/06	52/50	52/50
Maize, F.A.Q.	30/30	34/00	38/00	38/00
Paddy, Grade I, per 100 kilos	42/50	60/00	60/00	60/00

Total purchases by Grain Storage Department were as follows :—

	Tons 1954	1955
Maize	51,879	118,103
Rice at 60% extraction	15,575	20,765
White Sorghum	13,359	1,026

2. In the middle of October controls on the purchase and movement of maize were relaxed and only the guaranteed price remained. As a consequence, considerable quantities of maize were taken up direct by the trade and by sisal estates, and it is interesting to record that a substantial consignment of maize meal was exported to the Belgian Congo.

3. In 1956 all controls over paddy and maize are to be removed, but the Grain Storage Department will continue to offer a support price for maize based on a price of Shs. 35/- per 200 lb. bag (including cost of bag) at port. This is to be regarded as a purely interim measure, offering some degree of stability to producers while the trade is becoming organized.

4. The large surpluses of maize and rice which accumulated in Governments' hands as the result of good harvests coincided with a substantial drop in world prices to levels appreciably below those at which the produce was purchased. It is therefore expected that considerable losses will be incurred in marketing these crops overseas.

Cotton

5. The Lint and Seed Marketing Board maintained fixed basic prices to growers for Grade I seed cotton at sixty-two cents per lb. in the Lake Province, and 134 cents per kilogram in other parts of the Territory. Prices for Grade II seed cotton were raised to twenty cents and forty-five cents respectively in the hope that the enhanced price would induce cultivators to grade more carefully and to pick more of the low grade crop at the end of the season. The increase was more than justified by the prices which were ruling for B.R. lint, but it is doubtful whether the subsidiary objects were achieved.

6. One hundred and thirteen registered cotton Co-operative Societies operated in the Lake Province and bought 43·6 per cent of the crop. These societies were grouped into zonal unions which, in turn, formed the Victoria Federation of Co-operative Societies. During the year the Federation began negotiations for erecting a Co-operative ginnery at Kasamwa, and His Excellency the Governor laid the foundation stone of this building in November.

7. The ginnery zones in the Lake Province were revised in an attempt to bring about a more equitable division of the crop.

Coffee

8. At the end of April the marketing of the Bukoba coffee crop was taken over entirely by the Bukoba Native Co-operative Union. The Union went into partnership with one of the firms engaged in processing the crop.

9. No other changes in the marketing arrangements occurred, but considerable pressure developed among non-native growers in the Northern Province to be permitted to withdraw from their obligations to the Tanganyika Coffee Grower's Association and to sell the produce from individual estates independently.

Other Crops

10. No change occurred in the marketing arrangements for tobacco, pyrethrum and other major crops, but manufacturers in India showed dissatisfaction with the quality of cashew nuts being offered and demanded stiffer quality clauses in their contracts.

Produce Inspection

11. The subsidiary produce inspection service instituted at Mtwara was discontinued, since it was felt that no useful purpose was being served. The whole question of produce inspection was reviewed. On the one hand it was clear that the quality of much of the produce leaving Tanganyika could be very greatly improved and enhanced prices could probably be obtained if specific grading standards could be introduced and certified. On the other hand, the introduction of a grading inspectorate over such a vast length of Territorial boundary would necessitate a very high expenditure, both capital and recurrent. At the same time, the normal system of exporting crops would require considerable changes. Storage accommodation at the major ports is totally inadequate to allow for the regular inspection of all produce, and at the moment consignments are frequently moved direct from rail to ship.

IV.—MAIN CROPS

Tables of production which have in past reports been quoted under the sections dealing with individual crops have this year been placed in Appendix "II". In the case of crops such as cotton, sisal, tobacco, pyrethrum, tea and coffee, which are marketed through closed channels and are almost entirely exported, the figures quoted have a high degree of accuracy. In the case of crops largely produced by African peasants and partly consumed or processed in the Territory, it is impossible to attain accuracy; for this purpose export figures are the only reliable guide. Provincial estimates are, however, quoted because, being derived from similar sources year by year, they can indicate general trends over the seasons, and they are also of value in depicting the most important sources of supply.

Sisal

The year began with No. 1 Sisal at £69 per ton c.i.f. United Kingdom, a price that for many estates barely covered costs. At the end of the year the demand had increased and the price stood at £79 per ton, having risen to £85 in the middle of the year. Total production was a little below last year's, particularly in Tanga Province, where the heavy rains in May and June hindered drying and the failure of the short rains led to little leaf production.

2. There was again an expansion in the acreage under the crop and some planting companies are now experiencing difficulty in finding suitable land to replace areas which have become exhausted by two or more cycles of continuous sisal production. In fact, the whole question of fertility restoration and maintenance is now by far the most important problem which the industry has to face. The steady but unspectacular work which has been done at the Research Station over the past twenty years has given indications as to how the problem may have to be solved under various conditions of soil, rainfall and cropping, but it has yet to be discovered how these measures can be translated into economic practice.

3. Sisal is planted in the Lake Province mainly as a hedge, to help control cattle and erosion. It is however also a useful source of income if other crops fail; the price to the grower this year varied from £32.10s. per ton. Production amounted to 1,215 tons, compared with 5,100 tons in 1954.

4. The work of the Sisal Research Station, Mlingano, is reported on in Part II.

Coffee

(a) *Milds.*—Apart from the highly organized industry in the Northern Province, the picture in the other main coffee-growing areas shows very low yields at Mbozi, in the Rungwe District a much higher potential than has yet been tapped, and good progress in Songea.

2. There are 8,500 acres of coffee at Mbozi, from which only 228 tons of parchment were harvested. This very low yield is mainly due to the growers' lack of attention to detail and retention of old uneconomic trees, but the climate and soil are also partly responsible. The poor rains in 1953/54 weakened the trees, and this has been felt two seasons later: furthermore, the dry season in 1955 was very severe. Non-native farmers are showing an increasing interest in irrigation, in order to overcome the vagaries of the climate, but unfortunately there is not enough water to irrigate a large area. At the Coffee Sub-Station, work continues on "Black Tip", in conjunction with the Government Chemist. Briefly, the condition appears to have been cured by leaf sprays of zinc and boron, and the interaction of these micro-nutrients with other fertilizers is being investigated. This work is described in Part II of the Report.

3. Rungwe is thought to have a much higher potential for coffee than its actual production, and the industry there is being placed on a sounder footing than hitherto. The field staff of the Co-operative Union now work under an Advisory Committee, with the Field Officer (Agriculture) as its Executive Officer. Nurseries have been established for Lyamungu seed.

4. The Wamatengo at Songea have now learnt how to control stem borer and *Antestia*, and these measures are so well established that the Department is turning its attention to advice on pruning and shade.

5. A mild coffee industry is now being established in several new areas and nurseries are being planted up with seed from Lyamungu. At Lupembe, 1,100 acres of coffee have been planted, but only thirteen tons of parchment were harvested as very few trees have yet come into bearing. There is a very keen Co-operative in this area. In the Usambaras, interest has revived under the influence of good prices; yields are low on the poor mountain soils, but there is a very brisk demand for seedlings, especially for planting on slopes of over 25 degrees which are being withdrawn from annual cultivation. Further planting also took place in the Uluguru mountains. In the Buha highlands round Kasulu it is probable that *Arabica* coffee will thrive if it is effectively protected from prevailing winds. The first attempts to establish the crop on African holdings have not been particularly successful, because the programme was too ambitious. A slower expansion with more thorough instruction, especially in planting methods, should soon remedy the position.

(b) *Hard Coffees.*—The Bukoba crop was much less than anticipated, owing to smuggling into Uganda, where a price enhanced by the Assistance Fund was paid. Culture and quality, however, improved greatly. There is real progress in mulching plantations, removal of borer, timely picking and the preparation of the crop. The improved quality is also attributable to the changes in the marketing arrangements which have been referred to previously.

2. The price of Bukoba coffee dropped during the year from £320 to £220 per ton in the case of Robusta and from £440 to £330 per ton in the case of Arabica, both prices f.o.r. Mombasa.

3. There is a future for the hard coffee industry in other parts of the Territory. Some of the red soils at lower altitudes in Rungwe District are unsuited to *Arabica*, and the industry has died out in those areas. *Robusta* coffee should provide the cash crop which is badly needed, and seed is being obtained from Tanga Province, where there is a very small native industry. One estate in Tanga is planting 200 acres of *Robusta*.

(c) *Coffee Pests.*—The Entomologist, Lyamungu, continued his study of the white coffee borer (*Anthores leuconotus*) and can now confidently recommend treatment with dieldrin: an advisory leaflet on the subject was published by the Coffee Board.

Control of *Antestia* by insecticides is becoming a recognized practice on African holdings beyond the established confines in the Northern Province, and has now even reached Ngara.

Cotton

The cotton season in Tanganyika was one of contrast between the two main producing areas. On the one hand, a record Lake Province crop of excellent quality was harvested; on the other, the Eastern Province cotton was initially severely damaged by an unprecedented attack of Jassid and subsequently suffered from American bollworm and a plague of rats; owing to excellent food and brewing crops, growers lacked incentive to finish the harvest. In both areas, a greatly increased acreage was planted, but the rate of yield was low, even in the Lake Province, and in no way contributed to the record crop there, since the average was only 432 lb. seed cotton per acre. A high proportion of late planting and a lack of moisture to develop the top crop were responsible for low yields in the Lake Province, but the early end to the rain and the absence of pests or

diseases helped to produce a crop of excellent quality, valued at £3,888,000. It contained only 3·8 per cent of Grade B. Two other factors helped: firstly, much of the stained cotton remained unpicked; and secondly, additional stores have been built for the seed cotton, thus reducing damage by early rain before it can be moved to the ginneries. Cotton seed is a valuable by-product; 33,000 tons were sold at £16 a ton.

2. The Lake Province crop consisted of U.K. 53 and 51 strains and all seed was dusted against blackarm at two ginneries equipped with dusting machinery. The new selection U.K. 55 is to go through its first bulking stage in the 1956 season, prior to distribution in one ginnery zone. The dusted seed distributed for the current season amounts to 5,830 tons, including small quantities for Tanga, the Western Province and Zanzibar. With the emphasis everywhere on early planting, special stores have been built for the seed, which can now be brought out on lorries returning from the ginneries during the marketing season.

3. By contrast, the cotton in the Eastern Province, which should have shown an appreciable increase in 1955, was severely reduced by *Jassid*, bollworm, rats and unfavourable weather during the earlier part of the harvest. Poor cultivation continues to account for low yields in this Province, but propaganda for better methods had some success this year. Dusting against bollworm is fortunately only worth while if the crop is properly cultivated, and extension work next season has been planned on a basis of the full range of recommended practices. The Ilonga strain 47/10 was planted in two ginnery zones and the lint obtained ten cents per lb. premium over the local seed; extended planting of this strain is planned for 1956, even though its ginning out-turn is on the low side.

4. Red bollworm destroyed a great part of the Southern Province crop, but the cotton industry there is not of sufficient importance to merit a large scale investigation into control measures, especially when many vital problems are awaiting the attention of the Entomologists. It will therefore be necessary to await results from other countries before much progress with cotton can be made in that Province.

5. The future of the cotton crop elsewhere in the Territory largely depends on research. The situation in *miombo* country in western districts and on the Usangu plains is unpromising until *Calidea* and stainer can be controlled, yet cotton would otherwise often be a most useful cash crop. As was to be expected, trial plots in the Kahama and Biharamulo Districts were badly infested, but the Nzega plots, being in more open country, contained 90 per cent of Grade A. The control of stainers and *Calidea* is of such vital importance to such a large area that a team from the Colonial Insecticide Research Unit is to start making an intensive study of the problems at Urambo in 1956.

6. There should be a future for cotton in the plains of Tanga Province, where it is at present the most profitable cash crop. With a fall in the price of maize probable, encouragement will be given to part of the acreage of maize being replaced with cotton. Both there and in the Northern Province far more cotton was planted than in recent years. Yields were high, too, in the Tanga Province, on account of favourable weather, and the harvest was the largest for many years. Seed of type U.K. fifty-one from the Lake Province was brought in for distribution. It has consistently out-yielded all others in variety trials, on account of its resistance to drought and to *Jassid*.

7. In the Northern Province, yields were rather low, on account of drought and stainer attacks, but it is interesting to record that cotton was planted for the first time in many years at Mbugwe (Mbulu) and Mto wa Mbu (Masailand).

8. Although the quality of seed cotton in the Lake Province may have been excellent and although the ginners have made commendable efforts to improve on their poor performance in 1954, there is still room for the exercise of greater care and zeal. Stripper damage and foreign matter are the most serious faults. In the Eastern Province most gins are double-acting and modifications can reduce seed coat nep. Ginneries are being encouraged to standardize their machinery and to install single-acting gins.

Cashew Nuts

The price of cashew rose this year. It is a crop with comparatively low costs of production and the industry is expanding rapidly in all three coastal provinces. Export figures for the crop which matured over the turn of the year are expected to exceed 18,000 tons.

2. Overseas buyers continue to complain that the quality of the crop is low because there are too many inferior nuts and spotted kernels, but there was a marked improvement in the most recent crop owing to dry weather conditions at harvest. It is suspected that the spotting of kernels is caused by a sucking bug, which provides a mode of entry for the fungus *Nematospera coryli*, but it has not been possible to investigate this problem fully. Messrs. Pierce, Baumann and Co. kindly assisted the Department in conducting a mechanical grading trial by water flotation. Although the portion which sank was very much richer in sound nuts, the "floaters" also had a fair percentage of these. A report on this trial is at present being studied by the trade, both here and overseas.

3. Messrs. Pierce, Baumann and Co. are slowly developing their factory at Mtwara and hope to process about 350 tons of nuts for export in the coming season. With this new development, farmers and traders may at last become aware of the importance of quality. Hitherto, the entire crop has been sent overseas to India for processing and re-export.

4. Two species of the Mirid bugs, *Helopeltis anacardii Miller* and *H. bergrothi Reut.*, have caused considerable damage to cashew nut trees and to the fruit. Dusting trials using five per cent D.D.T. and 0·5 per cent Gamma B.H.C. showed, in the case of the D.D.T., a considerable reduction in damage to flowering shoots.

5. A "sudden death" disease of cashew nuts broke out on one estate in the Southern Province. It was associated with *Valsa eugeniae*, the fungus which is found in conjunction with "sudden death" of cloves in Zanzibar.

Cassava

The available production figures merely represent the surpluses of dried root which passed through Native Authority markets. It is impossible even to guess at the large quantities which were consumed by the growers or which were sold in townships and on sisal estates.

2. In most areas which are of marginal productivity or subject to attack by locusts there is a Native Authority rule that each taxpayer must plant one acre. Around Tanga an expanding market for fresh root among paid labour has led to an unusual voluntary compliance with the rule. But its value in semi-arid areas is in doubt, because termites attack the plant towards the end of

the dry season when its moisture content is lowered, and also make the establishment of cuttings difficult. It is certainly a major task to persuade cultivators to plant cassava, and the crop is seldom looked after properly when planted. It is also the crop which suffers most from pig and porcupine.

3. The two areas which traditionally produce surpluses are the Southern Province and Buha, in the Western Province: investigations are being made into the possibility of a small scale starch industry in these places, based on the factory treatment of fresh root.

4. Trials of mosaic-resistant cassavas, bred by officers of the E.A.A.F.R.O. at Amani, continue at various centres. The danger of spreading "brown streak", which may be present in some of these strains, is at present limiting wide distribution.

Coconuts

Most of what progress there is in the copra industry is taking place in the Tanga Province, where additional simple kilns have been built by Africans with the help of Development Loans, and kiln-owners have formed themselves into the Tanga Co-operative Society, which produced ninety tons of copra during the year. Coconut husbandry is improving and the industry is expanding under the influence of the bonus scheme. Altogether, in four years, planting bonus has been paid on 1,667 acres in this Province, of which 793 were planted this year; 100 acres of the latter were on non-native farms.

2. There was a steady fall in world prices over most of the year, although some recovery took place in the closing months. Most unfortunate of all, the premium on kiln-dried copra almost disappeared, leaving little incentive for growers to improve their quality.

3. The industry in the other coconut areas is inefficient, apart from a few well-run non-native estates, particularly on Mafia Island, and little progress has been made with the bonus scheme. Quality is poor in the Eastern Province, partly because much of this copra is sold to soap manufacturers, who are not concerned with quality. A Departmental campaign to improve the husbandry of the crop is meeting with little response there. The situation is no better in the Southern Province where, so far, little attention has been paid to improving this industry.

4. The sucking bug *Pseudo-theraptus wayi sp. n.* continued to do heavy damage to coconuts in the coastal belt; it was also found on mangoes, cashews and other fruit trees. In August it was decided to apply the results of small scale control experiments conducted in Zanzibar to a large scale trial in Mafia. Four double aerial sprayings at roughly three-monthly intervals were planned, but technical faults developed in the course of the first spraying and rain interfered with arrangements for the second. The trial is therefore being replanned. The expenses are being shared by Government and the planting company on whose land the trials are being done. The C.I.R.U. are providing professional services.

Maize, Sorghum and Millets

(a) *Maize.*—It is unfortunately impossible to quote a figure for the total production of maize surplus to the growers' requirements. Unknown quantities were sold to traders after the removal of restrictions in October, employers of fed labour are known to have made substantial purchases and it is suspected

that many peasant growers have been tempted by the high prices to dispose of grain which should have been stored for their own later use. Production was undoubtedly swollen by good yields from marginal land in the Southern Highlands and Western Provinces, which would probably not have been planted without the stimulus of high guaranteed prices.

2. Excellent weather conditions in most parts of the Territory led to record maize crops in most Provinces. Non-native producers in parts of the Northern Province were, however, unfortunate and large sums were paid out in guaranteed minimum returns. There were also partial failures in Sukumaland and in parts of the Eastern Province.

3. Maize breeding projects made good progress in the Southern and Eastern Provinces. In both cases local "Katumbili" was used as the starting point; at Nachingwea, rust-resistant strains with increased potential yield will be used on a farm scale in 1956, and at Ilonga, the final stage in evolving an open-polinated improved flint type has been reached. With a free market for maize in the future, farmers will be compelled to pay more attention to the true economics of cultivating this crop, and a greater diversification in the cropping programme in many parts of the Territory is to be expected.

(b) *Sorghum.*—As with maize, it is impossible to quote any reliable figures for surplus production; the safest guide is the export figure. It is however known that 1,026 tons of white sorghums were purchased by the Grain Storage Department at the guaranteed railhead price of Shs. 30/- per 200 lb. naked. It is also known that large quantities of off-white sorghums were handled by grain merchants in the Southern and Eastern Provinces.

2. Sorghum is undoubtedly a safer staple crop than maize in marginal rainfall areas, but it has the disadvantage that the palatable strains are susceptible to bird damage or are very slow-maturing, while the unpalatable strains are naturally not popular, except for brewing beer. The breeding programme undertaken by the Botanist at Ukiriguru seeks to remedy these faults by the production of a short-term, hard-grained, bird-resistant variety. The first strain to be issued, SUK/1, does not meet all the requirements, but has many desirable qualities; unfortunately the seed-bulking plots in the Lake Province were very adversely affected by a critical dry spell.

3. In the Central Province the variety *Enyanza* was widely distributed on account of its high yield and bird resistance; however, it quite inexplicably developed a longer maturation period, and the grain was also not popular for consumption. Other short term varieties are under trial.

4. In the Southern Province cold, overcast weather reduced sorghum yields very appreciably.

(c) *Pests and Diseases of Maize and Sorghum.*—Stalk borers are the most important pest of these grain crops in many parts of the Territory. It has been shown that damage can be reduced by observing careful after-crop sanitation, but such practices are not easy to apply to peasant agriculture. A high degree of control has been achieved on maize in the Western Province by the timely application of 5 lb. per acre of D.D.T. dust, but this is only an economic practice where crops have been grown well.

(d) *Millets: Bullrush Millet.*—This crop is a staple in parts of the Lake and Western Provinces. It is usually plant d late in the season, and the early cessation of the rains therefore reduced the crop to almost negligible proportions.

Finger Millet.—This is principally of use in beer-making and although it is an important crop, there are few reliable statistics available. It is known, however, that over 1,000 tons were exported from North Mara in the Lake Province to the Northern Province. Large quantities are also grown in the Ufipa and Iringa Districts; the traditional "Chitamene" system of cultivation in which forest is felled and burned every year for this crop creates a serious erosion problem.

Oil Seeds

These provide a steady if unspectacular cash crop in many parts of the Territory; at present prices they cannot compete with cotton where the latter has gained a firm footing, and in the Lake Province an erstwhile flourishing groundnut industry has now given place to subsistence plantings only. The chief producing areas are the Western, Southern and Central Provinces, but specialized centres also exist elsewhere.

(a) *Castor.*—No reliable figures for production are available, since much of the seed is known to by-pass Native Authority markets and in some parts of the Territory such market facilities do not exist. 7,870 tons were exported. The price rose slowly but steadily during the year and during the later months it had reached the very profitable level of £60 per ton c.i.f. The rise, however, came too late to influence planting in the season under review.

2. The collection of indigenous varieties for observation and comparison continued, and already some promising strains are coming to the fore. At Nachingwea, work by the Tanganyika Agricultural Corporation was concentrated on imported short maturation varieties suitable for reaping with a combine harvester.

(b) *Groundnuts.*—The world price failed to register its usual seasonal rise in August, and the general tendency was downwards. The year's rains in the Central Province were below average and groundnuts, which are traditionally planted late, were a partial failure. It is the policy of the Department gradually to replace local varieties with the rosette-resistant strains of "Mwitunde" which have been so successfully bred by workers of the Tanganyika Agricultural Corporation. The success of these varieties, however, depends upon their sole use over large blocks of land.

(c) *Sesame.*—The Southern Province simsim crop was very good this year partly because the weather suited it and partly because of a drive to get more planted. Experiments in husbandry and pest control have been carried out at Mahiwa Experimental Station and are described in detail in Part II of the Report. The main difficulty is to protect the seedling stage from the ravages of flea beetles; a local firm solved this problem in the Southern Province by putting up insecticidal dust in two-pound porous bags, from which the dust could be shaken out at approximately the right dosage. This insecticide not only helped to produce strong seedlings, but was also used with great effect against household pests.

(d) *Sunflower.*—The planting of sunflower is unlikely to reach again the peak levels of 1952, when the price was exceptionally attractive. Demand, particularly for the mixed quality produced in Tanganyika, is steadily declining, but the crop is so easy to grow and to harvest that it appeals to many cultivators as a small insurance, and growers in the Western Province had a particularly successful year.

(e) *Trichilia emetica*.—This is grown in one part of the Southern Highlands Province. The year was a good average one, and 216 tons were purchased by the local Soap Works. As there is no other outlet known for these nuts, this is probably the total crop from the existing trees, and there seems no inclination at present to the planting of more trees.

(f) *Allanblackia nuts*.—The collection of nuts of trees of *Allanblackia uluguruensis* and *A. sthulmanni* Oliv., which grow wild in the high areas of the Nguru and Eastern Uluguru mountains, began about two years ago. The United Africa Co. Ltd. purchased the whole crop of some fifty-three tons at approximately sixty cents a kilo. The oil is extracted and used as a butter substitute.

Pulses

The figures given in Appendix "H" represent only the quantities known to have passed through the markets. In addition 1,358 tons of haricot beans were produced in the Northern Province, and substantial tonnages of other pulses found their way into the trade by unofficial channels. The export figure was 8,279 tons, comprising yellow peas, soya, chick pea and possibly small quantities of mixed beans, cowpea, green gram and pigeon pea.

2. There are few parts of the Territory which will not grow one of the pulse crops; these are in demand as subsistence crops and for fed labour and town-dwellers as well as for export. The majority of them are very susceptible to attack by *Bruchids* whilst in storage, and they have either to be protected or moved very quickly.

3. The haricot bean trade suffered a severe setback in the Northern Province both from ill-distributed rainfall and from "oily pod"; exports were very little higher than in 1954, in spite of increased acreage. Further difficulties were encountered in establishing the crop in the Bukoba District, and there is a possibility that high transport costs there may kill it. The unfavourable season for seed beans led to large quantities of rejects being sold as "mixed beans".

4. Yellow peas, which enter the European grocery trade as "split peas", had an unfortunate season in the Southern Highlands. A remunerative price in 1954 led to increased planting in 1955, but subsequently considerable damage was done to the crop by frost and then the world price came steadily down, owing to unusual offerings from India. Two new varieties were imported from the U.S.A., and both show promising characteristics.

5. Overplanting of chick pea, with a consequent catastrophic fall in price in 1954, led to underplanting in 1955, but even so there was no substantial improvement in the price. The crop is a useful one, as it will mature on the residual moisture in valley land at the end of the rains.

6. Now that the Tanganyika Agricultural Corporation have discovered the varieties best suited to conditions at Nachingwea, soya beans are assuming importance both on the tenant holdings and on the larger farms where a combine harvester is used. Yields of up to 1,200 lb. per acre were obtained, and there is no doubt that soya bean culture could profitably be extended.

Pyrethrum

Early in the year there appeared to be a danger of rapidly expanding production overtaking consumer demand. The view taken was that the market could absorb a steady increase in production but might be seriously dislocated by a sudden large rise, and it was thought that applications for substantial increases

in licensed acreage might have to be scaled down. In the event no such restrictive measures proved necessary and the year ended on a very hopeful note, with a marked expansion in each of the main producing areas.

2. Good rainfall in the Njombe District led to excellent flowering there, which is also believed to have been stimulated by heavy frosts in August. Experimental work in co-operation with the Uwemba Farmers' Association continued, and is described in Part II of this report. Increasing interest is being shown in this crop by Africans, both in the Njombe District and in the Northern Province, but progress by the Co-operative near Njombe has been very slow.

3. The new Ordinance ran into further pitfalls, and still had not reached the final draft stage by the end of the year.

4. As before, the crop was marketed through a joint pool with Kenya, and payment was made on the basis of pyrethrin content. Farmers receive an initial payment as soon as their produce has been weighed in by the T.F.A., a second payment when the consignment has been analyzed and a final dividend when the annual pool is wound up.

Rice

On the whole, 1955 was a good year for rice. The Rufiji flood reached just the right height and 6,400 acres were ploughed by the Native Authority tractor scheme; the Kilombero valley did well; records were broken in the Tanga Province; the Lake Province did not quite come up to expectations; the Rungwe crop reached 5,000 tons in spite of heavy flooding.

2. The guaranteed paddy price remained unaltered at Shs. 60 - per 200 lb. delivered Dar es Salaam. Declining world prices soon went well below this level, and at the end of the year there was a large surplus, over and above local needs, which had to be sold at a very substantial loss.

3. Many parts of Tanganyika, by virtue of their soils and climate, are well suited to the production of high quality rice with high yields per acre. The present potential production will be steadily increased as various irrigation schemes come into full operation. It is therefore of vital importance to place rice culture and processing on a fully economic footing; not only must the inhabitants of the Territory be able to buy the quality of their choice at competitive world prices, but also recognized grades must be established which will be in demand in outside markets. The first requirement for bringing this about is a display of foresight, energy and drive on the part of the milling industry—qualities which have not been markedly to the fore during the control period which is now drawing to a close. Until millers are prepared to discriminate when buying paddy from the grower, and to mill the different qualities separately, it is useless to try and persuade African cultivators to improve their seed or their harvesting methods. It would theoretically be possible, by creating a large body of inspectors and enacting many rules and regulations, for Government to achieve the desired results by compulsion; but more lasting and genuine progress can be made if the initiative surges up through the industry itself, to act as an inspiration not only to the cultivator but also to the scientist and extension worker who stand behind him. The Plant Breeder at Mwabagole in the Lake Province has already isolated improved strains of local varieties and of some promising imported types; the stage is set for multiplying seed of good potential.

Seeds

The main seed crop was again French Beans, which are produced almost entirely in the Northern Province. There was a brisk demand early in the year and a record quantity was contracted for, but early cessation of the rains coupled with a serious incidence of a hitherto unrecorded disorder, termed "oily pod", severely reduced yields and adversely affected quality, both in the Northern and parts of the Tanga Province. The cause of this disorder has not yet been discovered, in spite of intensive work by an entomologist, a pathologist and a plant physiologist.

2. It is of interest to record that the pioneer of this industry gained the only two gold medals awarded by the Royal Horticultural Society in trials conducted at Wisley; he was competing with growers from all parts of the world.

3. There has been an increasing interest in seed peas in both the Northern and Southern Highlands Provinces, and one estate near Songea produced lettuce seed.

4. Little progress was made with the seed bean certification scheme designed to meet the requirements of the Australian authorities and at present there is no demand for such certificates in other importing countries. Consequently, there has been no demand from growers for this service. However, lettuce crops grown for seed destined to be exported to the United Kingdom now have to be inspected in the field for mosaic.

Sugar

No new large scale enterprises started up during the year, though negotiations for an extensive site in the Eastern Province continued. The sole producer of white sugar was the Tanganyika Planting Company near Moshi. Here work on the new factory was held up by late deliveries of plant, and some difficulty was experienced in handling the increased crop which had been planted in anticipation. The new irrigation system, including headworks and night storage reservoirs, came into full operation. Production by the Company over the last five years has been as follows:

1951	1952	1953	1954	1955	Acreage (1955)
8,805 ...	9,666 ...	10,708 ...	10,732 ...	10,415 ...	6,000

2. Jaggery production in the Eastern Province again declined owing to the unremunerative prices which ruled for this commodity. Even on the fertile soil of drained swamp land in Bukoba, where very high cane yields were obtained, great difficulty was experienced in maintaining production at an economic level.

3. "Ratoon Stunting" disease was found to be present in many parts of the Eastern Province; the museum collection of imported strains established at the Coast Agricultural Station, Chambezi, is heavily infected and will have to be replanted after heat treatment. Importations of new strains now undergo a period of quarantine at Maguga, under the auspices of the East African Agriculture and Forestry Research Organization; they are then given a first multiplication stage in Uganda, and from there they are distributed in equal quantities to each of the three territories, after receiving heat treatment.

Tea

The tea industry continues to expand steadily, with new factories being built in both the Provinces where tea is grown. At present the areas in the Southern Highlands Province at Mufindi and Rungwe are estimated to be 4,000 acres and 2,922 acres respectively, while 3,300 acres are planned for Njombe, where tea has never been planted before. The acreage in the Usambaras is approximately 4,000.

2. Dr. T. Eden visited the Southern Highlands to advise on the possible expansion of the tea industry there. His report has been published and he is guardedly optimistic regarding some of the land he visited, but has definitely ruled out other areas which had previously been looked upon as possibilities.

3. The Southern Highlands had excellent weather during the year, which combined with the expansion of the industry, led to a record crop. By contrast, there was a drop in the Tanga Province crop, for which the failure of the short rains in 1954/55 was responsible. Prices fluctuated in accordance with world trends, but as most Tanganyika teas are of excellent quality the industry had a satisfactory year.

4. In addition to manufactured tea, forty-two tons of tea seed, valued at £26,524, were exported to neighbouring territories from the Southern Highlands

5. The Tanganyika Tea Board makes a substantial contribution to the East African Tea Research Institute at Kericho, in return for which planters receive technical advice on their various problems. However, apart from one or two standard manurial experiments, designed by the Institute but operated by estate Managers, no direct and organized experimentation has been undertaken under Tanganyika conditions; this position is likely to be rectified shortly.

6. The Board recommended to Government that legislation governing the licensing of new tea planting should be rescinded; this request was accepted and a draft Bill was prepared.

Tobacco

(a) *Flue-cured.*—In the Iringa District a further stage was reached in the attempt to change over from the old *Amorello* strain known as "Ehlers" to Virginia types of leaf. Promising results were obtained both on the Tobacco Board's research station, Seatondale, and by several local farmers who planted trial acreages; some 11,000 lb. of leaf were produced. It is now clear that good quality leaf can be produced on farms in the warmer areas and where early rain is normally expected, but correct fertiliser practice for producing high yields and a good-sized leaf has yet to be discovered. Furthermore, it will undoubtedly take a season or two for farmers to learn the more delicate technique of curing Virginia tobacco.

2. The commercial crop of *Ehlers* reached a figure second only to the previous year's record. Growing conditions were favourable, but the resultant leaf was light, even for *Ehlers*. The crop was again marketed through the Southern Highlands Non-Native Tobacco Growers' Union, which was faced with very difficult problems of overproduction, for at the beginning of the season some of the 1954 crop still remained unsold. Eventually the East African Tobacco Company took the majority of both crops at prices which offered a fair return to the growers, but ironically enough their main interest was in some of the lower grades, and this in a year when bright grades predominated.

3. The marketing of a Virginia crop also presents very serious difficulties since, however carefully it is handled, there is always a danger of contamination by occasional *Ehlers* leaves: it is therefore unlikely that full world prices will be obtained until *Ehlers* has been eliminated entirely from the District, but to do this would deprive some of the late-season, colder farms of their chief cash crop. Heavy sales of *Ehlers* to the East African Tobacco Company were only made at the expense of future deliveries, and it was therefore necessary for all growers to co-operate in a planting programme for 1956 which restricted acreages and included far more Virginia than was prudent in the present state of our knowledge and experience.

4. The area suitable for tobacco-growing in Iringa District is limited. However, there are considerable stretches of land in the Chunya District where the soils appear to be ideal for flue-cured Virginia tobacco. A representative site was obtained for a small test station, and trials have been laid down there in the current season.

5. Production elsewhere in the Territory is still only on a small scale, but the future is promising. The Tanganyika Agricultural Corporation farms at Urambo produced 246,400 lb. and expanded production is planned for 1956. The quality of this crop is steadily improving as farmers gain experience, and this season an average price of Shs. 3/39 per lb. was obtained. The whole crop is sold to the East African Tobacco Company on contract, and as the distance to Jinja is comparatively short, there is no need for an expensive conditioning plant. The Tumbi Leaf Centre, run by the East African Tobacco Company in the Western Province, distributes seedlings and buys green leaf from local Africans. This scheme has proved popular and more barns are having to be built for curing the crop. The varieties used are Bonanza and Harrison Special. Some 12,200 lb. of cured leaf were produced there this year.

5. There was an increase in the Southern Province crop, but nevertheless poor organization and inexperienced barn management caused the loss of considerable quantities of leaf. The best quality from this Province was produced on alienated land in the Songea District, but the initial attempts of a few Africans there were not particularly successful.

(b) *Fire-cured.*—Fire-cured tobacco is a useful cash crop in those areas which are marginal for coffee and where cotton is not particularly suitable. It can be successfully processed by most Africans if they are properly instructed, but the sustained effort required is alien to the African temperament, and as a rule the individual acreages cultivated are pitifully small. The Biharamulo crop has declined considerably for this reason, and the people are being attracted into the Geita District by the prospects of easier riches from cotton.

2. The Kibondo and Ngara crops by contrast are expanding. Many more people grew tobacco this year, and the fact that the production figure remained the same in Kibondo was due to the export of coil tobacco over the border into Urundi. Coil tobacco usually commands a higher price there than that paid for cured leaf by the East African Tobacco Company, but on the whole the people prefer the organized marketing facilities to the long trek over the border.

3. Both the Kibondo and Ngara crops are marketed through the Nyamirembe Native Tobacco Board, and in order to cut down the Board's grading costs it was arranged that the growers should grade the crop themselves under the

guidance of instructors. The leaves were tied into small bunches, so that they could easily be re-graded if necessary at the Nyarumbugu factory. This experiment was successful. Although the Biharamulo Ngara crop was of good quality, that from Kibondo was rather poor, only half of it being Grade I. This was partly due to poor cultivation and partly to the seed used, which appeared to be off-type. New seed for the next crop was imported by individual districts from Nyasaland. The Tobacco Board also purchased new seed for bulking under more rigorous selection at Nyarumbugu.

4. In the other big production area, Songea, the crop was only half what it should have been. Much of it had to be re-planted after attacks of leaf-curl disease and eelworm, while the sunless weather produced a small light leaf of low quality. The quality is, however, always inclined to be poor, and seldom is more than half the crop Grade I, owing to inferior processing. This is particularly unfortunate, since the top grade enjoys a high reputation in the United Kingdom. The crop is in fact merely air-dried, with a final smoking to produce a fire-cured effect, and is then further processed in the factory of the Ngoni-Matengo Native Co-operative Union, who sell the high grades overseas and the rest to the East African Tobacco Company.

Wattle

During the year this Department took over from the Forest Department the responsibility for administrative duties and extension work in connection with wattle.

2. The first plantings in the Usambaras were harvested, and yielded bark worth £62,500 from steep worn-out slopes where previously only a few uneconomic cattle grazed. Much of the bark was rather immature, but any disadvantages of such shortcomings were far outweighed by the great psychological benefit of seeing cash come in from this waste land. The success of future efforts to protect soil in this way should now be assured. Wattle scale (*Iserya purchasi*) became a menace to these Usambara plantations in the dry season. The Forest Department, continuing to take an interest in the crop, have introduced a natural enemy, the ladybird *Rodalea cardinalis*, from South Africa.

3. The development of the Colonial Development Corporation's wattle estates in Njombe District progresses favourably, and the construction of the tannin extract factory has begun. Encouraging progress is being made with the Bena Wattle Scheme, a Native Authority scheme which is being fostered in co-operation with the Colonial Development Corporation, who will process the bark. Some 2,000 acres had been planted at the end of 1955.

Wheat

While in the Northern Province the short rains crop was good, amounting to 2,000 tons, the long rains' season was disastrous. The Ngare Nairobi crop failed completely through drought, while wheat in all other areas was very severely attacked by stem rust and many crops were virtual failures, while others were greatly reduced. These failures led to the payment of large claims for guaranteed minimum returns; and more wheat than usual will have to be imported from Kenya.

2. Trials of new varieties bred in Kenya have continued, but the breeding of resistant varieties suitable to the lower levels of the Territory requires more attention, and plans have been made for this to be undertaken in the Northern Province in close co-operation with the Senior Plant Breeder of the Kenya Department of Agriculture.

3. There is probably a potentiality for increased wheat production at the Mbeya end of the Southern Highlands Province, particularly in the African areas. The Senior Plant Breeder of the Kenya Department of Agriculture and a representative of Messrs. Unga Ltd. visited Mbeya to examine the possibilities of expansion, particularly in the Mbozi areas. The main drawback to this area for wheat production is its distance from the present mill and from markets for any surplus production.

4. Wheat is a staple food of the Africans in the Ukinga mountains of Njombe, and it is estimated that some 2,500 acres are grown by Africans in the Njombe District. Much of this production is not reflected in the market figures, as it is either consumed on the spot or bartered for a better return than the official price.

5. In Songea, the future for wheat is uncertain, now that the Mission mill has closed down. Growers are demanding a higher price than can be economically paid if the wheat is to be exported from the District for milling, but the possibility of transporting it to Mbeya is being investigated. An appreciable proportion of the 1955 crop found its way to Dar es Salaam, where there is a small demand for whole grain, which is partly met from scattered plantings in the hills of Mahenge and Kilosa.

V.—MINOR CROPS

Cacao.—Almost the entire production from the only area of mature cacao was taken up for seed by an adjoining estate in the Tanga Province which has embarked on an extensive planting programme. The natural vegetation is being retained as shade and soil cover, and the young trees are being planted in cleared contour traces.

Chillies.—A few non-native farmers in widely separated parts of the Territory have turned to chillies as a small scale cash crop and are obtaining very satisfactory results. The labour requirement, however, is high.

Derris.—The market for derris root is remarkably steady, and production on one estate near Tanga is increasing. Good rainfall, high humidity and a light loamy soil are required for success; where these exist, the crop should be suitable for smallholdings.

Essential Oils.—Production is now confined almost entirely to bitter orange oil. Markets are very selective, and oils produced in Tanganyika have to compete with industries established in places where local conditions are particularly suited to the growing of high quality oils. At present the fifty acres of geranium in Njombe District are under care and maintenance only. One farmer there distilled 120 lb. of eucalyptus oil. One Tanga estate continues to produce bitter orange oil, for which it has an expanding market; 8,000 lb. were produced this year.

Fruit.—The canning industry should provide a useful export market but at present it is confined to the Northern and Tanga Provinces. The canning factory of Federal Products Ltd. at Muheza absorbed 500 tons of citrus for juice extraction, fifteen tons of pineapples and quantities of other tropical fruit; 572 tons of oranges were also exported to Kenya for juice extraction.

2. There is unlikely to be any expansion of the orange industry in Tanga Province, because the juice market is limited and the quality of the crop is too low for export beyond East Africa as fresh fruit. At present the crop is profitable, the price being in the region of £4. 10s. to £9 per ton, and, for the first time for years, interest was shown in re-planting. Altogether 2,000 tons of oranges were produced but less than half of this was sold for juice extraction and the remainder was hawked locally or sold in Kenya. Morogoro and the Pugu Hills supply the Dar es Salaam market.

3. The prospects for grapefruit, however, should be very bright. Canned sections of high quality were produced at Muheza, mostly from fruit off the orchard at the Sisal Research Station. Fruit of excellent internal quality is also produced in the Eastern Province; although the external appearance is not always up to the standard demanded by the European market, it should be possible to develop either whole fruit or a canned product for export.

4. Pineapple growing at Muheza is expanding on both native and non-native farms. Experiments are being conducted on the culture and manuring of the crop, and canning trials of the fruit have been encouraging. Shortage of planting material is a limiting factor at present.

5. There is also a market for passion-fruit. The crop is grown by Africans for sale to Tanganyika Passion Fruit Ltd., Lushoto, for juice extraction, and eighty-one tons were sold this year.

6. Tomato pulp is in steadily increasing demand for re-canning in various forms in the United Kingdom, and sterling sources of supply are being sought: in an attempt to meet this potential market, variety trials are planned for the dry season on irrigated land in several parts of the Territory. Meanwhile a factory is already operating in the Northern Province, while at Muheza Federal Products Ltd. are canning a local variety with success. The crop is unfortunately liable to suffer from several serious fungus diseases which may be difficult to control economically.

7. In most of the hill areas deciduous temperate fruit is grown, and plums in particular are produced in large quantities over short periods. Drying would seem to be the only way of profiting from these gluts, because transport charges on jam or canned fruit would be prohibitive.

8. There is a very small production of dates in the Western Province.

9. Bananas are an important food in all the wetter areas of the Territory and are of special significance as a permanent crop on the Usambara Land Usage Scheme. The only bananas grown for export are at the mouth of the Pangani River, where Arabs cultivate them for the Mombasa market. Unfortunately they can no longer compete with Kenya plantations and exports have dropped from 1,745 tons in 1949 to 300 tons in 1955. Although "Panama disease" was found in one or two new areas, the most notable of which was Mafia Island, there was a general reduction in the number of outbreaks which had to be treated.

Vegetables.—This includes green vegetables, onions and European potatoes, for all of which there should be a promising future, as the standard of living rises. Irrigated areas in particular will offer a steadily increasing potentiality, but at the moment markets are not sufficiently developed and communications are too long for much expansion except near the coast.

2. The principal markets for fresh vegetables are Dar es Salaam, Tanga and large sisal estates, but provincial capitals and other townships also offer opportunities for enterprise; Mwanza is at present particularly badly served. It is unfortunately quite impossible to quote any realistic figures of production.

3. Dar es Salaam is served mainly from the Ulugurus and the Southern Highlands, but increasing quantities are now being produced by market gardeners of many races in the immediate vicinity. The Uluguru Co-operative, centred at Mgeta, suffers from a number of disabilities, among which are the distance from the main market and the presence of competitors who are continually tempting members away from their loyalties.

4. The Tanga market is supplied by a native industry in the Usambaras, where really spectacular progress has been made. Vegetables are now part of the Land Usage Scheme, and their inclusion by the people as an organized industry was a spontaneous development. Bench terracing and controlled irrigation have been introduced voluntarily by the growers, without any need for legislative action.

5. Besides these native industries, there is one Northern Province farmer who has installed overhead irrigation and is producing vegetables intensively for sale in Nairobi and Mombasa, as well as Tanga.

6. *Potatoes.*—The main markets for these are also Dar es Salaam and Tanga which are supplied from the Ulugurus and Usambaras respectively. European potatoes are a staple food of Africans in the Porotos and Ukinga mountains of the Southern Highlands, where 7,000 tons were produced during the year. There is no regular export market for this crop, but considerable quantities are sold by the tin on the roadside to the drivers of long distance transport.

7. The quality of native grown potatoes has never been good, partly because of potato blight (*Phytopthora infestans*) and partly because the crop is usually allowed to regenerate from tubers left in the ground without any further cultivation. Nevertheless, growers expect a very high price, and at certain seasons they lose the coastal market because it is cheaper to import from South Africa.

8. The programme for improving the industry is first to import a few tubers, as new varieties become available, from the Scottish Plant Breeding Station and to test them for blight resistance over several plantings at Kungului Farm in the Lushoto District. Any promising varieties would then be multiplied wherever they were required, from freshly imported seed, so as to avoid the possibility of spreading any local diseases which might be present in the Lushoto area. Variety 1521c (3) is an outstanding one, and is already being bulked in many parts of the Territory. This variety is responsible for the revival of the industry in the Usambaras, where it was wiped out by blight in 1943.

9. *Onions.*—Onion production suffers from variations in price throughout the year, as gluts come and go on the markets. Production is expanding in the Northern, Western and Southern Highlands Provinces, but marketing in remote districts often presents a difficult problem. The larger growers in the Southern Highlands store their crop until the price rises. Some Baluchi farmers in the Usangu area have started to produce seed of an Egyptian variety which stores better than the Bombay Red, which is the strain usually planted.

Gums.—Among wild products collected by natives for which there are good prices are Gum Arabic and Gum Copal. These are particularly important in dry places as a source of cash in poor crop years. A premium could exist for quality, and a grading system is being considered for the Central Province, but success will depend upon the co-operation of the traders, who are psychologically allergic to quality standards of any description.

Kapok.—The price for kapok remained attractive throughout the year, and substantial new plantings were made. The crop is mainly confined to the lowland areas of the coastal Provinces. Better market facilities led to a revival of interest in it in the Western Rufiji area. Kapok borer (*Tragioschema nigroscripta*) has caused serious reduction of the crop in parts of Morogoro District.

Oil Palm.—The two developed centres of production are on African smallholdings in the Luiche Basin near Kigoma, and a non-native estate near Tanga. There are, however, some magnificent palms in the Bukoba District, which indicate possibilities of development there; and plantings just above the valley bottoms at Mahiwa in the Southern Province have started to produce such unexpectedly good crops that expansion seems justified. Seedlings are being made available both at Mahiwa and at Luiche; but the demonstration plot at the latter place, being on poor, non-typical soil, has been closed down.

The factor which chiefly limits expansion is the high labour requirement of the cottage oil-extraction process. There are probably no sites in the Territory where uniformly suitable land could be found in a quantity sufficient to justify the erection of an economic large-scale factory, though some of the peat land in Bukoba might meet the case. Small-scale machinery is to be tested at Mahiwa and, if these tests are successful, the result should be a great fillip to the peasant industry.

Total territorial production this year amounted to 123 tons of oil and 400 tons of kernels.

Pawpaw Papain.—The pendulum of alternating high and low prices for papain lost its rhythm and the low prices of 1954 persisted throughout 1955. Production was consequently confined to a few growers who had established connections for a regular supply of a high quality product. A standardized article, conforming to a specific analysis, might possibly be more in demand, but it is unlikely that the price even for this would attract enough growers to justify the expense of setting up an organized system of sampling.

Raffia.—The production of raffia which is confined to the south coastal areas of Kisarawe District, has shown a steady increase over the last three years, probably because of the steady high prices. The estimated production for 1955 is seventy-five tons, worth £7,500.

Spices.—At the foot of the eastern Usambaras (and probably also in parts of the Eastern Province) there are small areas of high humidity where pepper, cloves and nutmegs can be grown. Production is not large, but returns are profitable, and interest in new planting is waxing.

VI.—VERMIN AND GENERAL PESTS

(a) *Small Game.*—In places where agriculture is practised on scattered holdings with shifting cultivation, small game will always present a major problem, to which no lasting solution can be found. This argument supports lethargy,

and tends to make the reasons against energetic protective action seem overwhelming, especially when increasing reliance is being placed on cash crops such as castor, which are comparatively immune to attack. Nevertheless, the extension staff in most parts of the Territory organized drives against the two chief menaces, baboon and wild pig; netting and poisoning were the methods mainly employed. In the Lake Province, where two Vermin Control Officers are employed by the South East Lake County Council, conspicuous success has been obtained in porcupine control.

An alternative to destroying these vermin is to keep them out of cultivated land. Progress in this direction has been made in the Western Province, where blocks of land are isolated from pig by surrounding them with deep trenches. The main difficulty is the maintenance of the trenches during the rains. An interesting innovation in vermin control has been introduced into Sumbawanga from the Congo; this consists of building solid grass fences round each individual shamba, so that a pig, once inside, is lost in a maze and can easily be destroyed.

In the Central Province, an experiment is being conducted with electric fences, to see whether tsetse fly can be excluded from settlements by controlling game.

(b) *Rats.*—Rats can do a great deal of damage when they build up into plague proportions at harvest time, as happened in some of the lower altitudes of the Southern and Eastern Provinces in 1955. Though some success was achieved by poisoning, this action was taken too late to have an appreciable effect, and it is clear that a full investigation needs to be made to discover what measures can be taken to prevent the plagues from forming.

(c) *Grain-eating Birds.*—More has been learnt of the seasonal movements of the Sudan Dioch (*Quelea quelea aethiopica*), and an extensive ringing campaign has been started, in conjunction with the Kenya Government, to define the limits of this movement. Very large numbers of Queleas moved into the Northern Province in August, but damage to wheat was largely prevented by immediate control measures, using the fire-bomb method in roosts. The detailed biology of the species is now fairly well known, but work has continued on the factors which bring the birds to breeding condition. The Zoologist has co-operated with Dr. Marshall of St. Bartholomew's Medical School, London University, in examining changes in the gonads of caged birds throughout the year. The Colonial Insecticide Research Unit continued to assist in the search for effective chemicals for control by spraying. The Assistant Director (Extension) attended an international conference on the subject in Dakar, and obtained valuable ideas for intensifying the campaign against this plague.

(d) *Locusts.*—At the end of 1954 there was a heavy Desert Locust invasion into Unyamwezi and the Lake and Central Provinces from Kenya, after the failure of the short rains, and swarms penetrated as far south as Iringa. A second invasion occurred in February 1955, affecting the Northern, Tanga and (again) Central Provinces. In all cases the hopper bands were successfully destroyed by officers of the Desert Locust Control Service, working in close co-operation with the District Administration and this Department. The damage done to crops was negligible.

Red Locusts in the western outbreak areas gave cause for alarm by building up into swarm proportions, but the situation was kept under control by the Red Locust Control Organization and no serious escapes occurred.

VII.—SOIL AND WATER CONSERVATION

As mentioned in the introductory remarks, the abolition of the post of Chief Soil Conservation Officer took effect on the 1st July, 1955. The mechanical units, under an Agricultural Officer and a Senior Field Officer, continued to operate in the Northern Province, and completed the following works:

Broad-based terraces	1,178	acres
Diversion channels—drainage ways	1·5	miles
Waterways and training banks	4·1	miles
Dams and hafirs	24	with a total capacity of 101,000,000 gallons.
Silage pits and fishponds	28	

Sundry earthworks, to the value of £3,417.

The total value of the work completed was £18,623. The survey section developed considerably; not only were many farm plans drawn up, but a map was prepared showing the distribution of African smallholdings in a crowded part of the Mbulu District.

In every district soil conservation measures on arable land were encouraged by extension officers of the Department. Trash bunding is especially characteristic of the Northern Province, being the standard technique for Mbulu and an increasingly popular one in the other Districts. This method has also been adopted in the Ngara District of the Lake Province. There is some doubt, however, as to whether the accumulation of stover encourages stalk borer in succeeding crops of maize.

In the other parts of the West Lake and in the Southern Highlands, contour banking is the method being principally encouraged; and in Rungwe 144 miles of banks were constructed during the year.

In the Hehe chiefdom of the Southern Highlands, cultivation on big ridges is an indigenous practice and the Department's aim is to encourage their construction on the contour. In the drier parts of the Territory, such as Unyamwezi, Sukumaland and the Central Province, there is little doubt that tie-ridging is the best method for arable land, and in parts of Unyamwezi and Sukumaland it has almost become an accepted practice.

The equivalent of "yeoman farmers" are emerging among tribes in many parts of the Territory. Such people will probably be the key to progress among the mass of their fellows in the future, but they often have soil conservation problems which have not yet been adequately solved. In Iringa District, for example, large-scale maize farmers have abandoned their traditional ridge cultivation because they find it too expensive with employed labour and are not yet equipped for the mechanical construction of ridges. Similarly, in the Northern Province, trash bunding is not entirely suitable for the larger African holdings cultivated by ox- or tractor-drawn ploughs.

In the drier country in the Central, Western and Lake Provinces, overgrazing has continued for many years, leaving large tracts of badly eroded land which must be regenerated. In many cases, erosion of arable land is inextricably bound up with overgrazing and there will be no complete solution to the problem of soil conservation until livestock numbers are controlled and the herds regarded more as a cash crop than as wealth in themselves. As long as communal grazing continues, individual cattle owners can see little reason for working to improve the grazing or for reducing their own stock, and administrative pressure has to be maintained in order to keep the stock within reasonable limits.

Erosion of this type is severe in the older settled areas of Sukumaland and Ukara. Although the general problem is far from being solved, there are many local projects aimed at the regeneration of bad areas. Merely prohibiting grazing has been successful in Maswa, although in really bad areas the healing is very slow. Elsewhere, gullies are regenerating after grazing has been excluded and sisal, elephant grass or *Manyara* planted.

In Shinyanga District, marked improvement has been achieved in one badly eroded area by insisting on full tie-ridging and excluding all cattle for two years. At Isunganholo, which was one of the worst eroded parts of east Shinyanga, there was conspicuous progress in the pilot area which was protected from grazing, contoured and planted with *Cassia siamea* and *Manyara*.

A scheme for the conservation of the badly eroded areas in the centre of Ukara is now under way. This includes the construction of graded contour banks, the blocking of gullies and the planting of banks and gullies with sisal or elephant grass.

A problem which is particularly acute in the Central Province is the extremely heavy storms which follow long periods of drought, with the result that tremendous quantities of water run straight off the sun-baked land. This, coupled with the extremely erodable type of soil there makes conservation very difficult. Besides the annual tie-ridging, contour banks are being built as an additional precaution on both arable and pasture land. Particular mention should be made of the contour banking near the Central Railway line at Msomalo. Heavy run-off from this area, which threatened the line and often caused washaways, is gradually being brought under control.

As a rule, these violent storms are very local. In a normal year the customary soil conservation measures appear adequate to control soil wash and little damage is done. Towards the end of December 1955, however, catastrophic storms occurred over wide areas in quick succession, causing an enormous run-off. The top soil of an entire hillside at Madodwa was washed away, together with all the contour banks, leaving only bare sand. Altogether in the Central Province some 5,000 acres of African fields were wrecked in this way.

It is hoped by the development of water supplies in the Central Province to spread the human and animal population more evenly, and progress with this continued. Overcrowding naturally occurs in the best-watered parts and soils there become worn out. In Ugogo the aim is to establish permanent water supplies every ten miles. Hafirs or dams are being built where bore-holes are impossible, and this phase of construction is almost complete.

Increasing concern is being felt over the water supplies in parts of the Southern Highlands, particularly in the Mbeya Range, where cultivation and destruction of the natural cover is interfering with the water regime. Legislation has been enacted to control the number of families in the range and some of them will be moved out in 1956 to more suitable land. At Mbozi, a joint natural resources survey was undertaken and recommendations were made for restoring or improving the scanty water supplies.

VIII.—LAND USAGE AND SETTLEMENT SCHEMES

The pointers to the importance of land use planning and guided settlement schemes are steadily becoming more prominent; in fact these aspects of extension work form the pivot of the re-orientation of Departmental policy. Among

these pointers may be mentioned the brightening dawn of many irrigation projects, the mounting success of the Tanganyika Agricultural Corporation's tenant farmer schemes, the inevitability of more individual patterns of land tenure, and the necessity of relieving population pressures in such a way that the factors causing congestion are not likely to recur. The normal sequence of events by which a project is built is—

(a) extensive survey;
(b) selective intensive surveys;
(c) agricultural trials;
(d) construction of necessary works and
(e) settlement.

2. The chief project under investigation in stage (a) was the Rufiji Basin Survey; this is partly financed by F.A.O., but the bulk of the funds are found from the territorial allocation under Colonial Development and Welfare. Work went ahead more rapidly than expected, with the result that a start could be made with intensive surveys in selected areas and with one of the trial farms.

3. Two other extensive surveys were completed by teams built up from the Departments chiefly interested. The first of these teams covered an area of 640 square miles adjoining the Dar es Salaam Morogoro road and made recommendations regarding forest reserves, ranching, large scale farming and African settlement. The second examined 1,100 square miles in Handeni District, with the particular object of finding the best site for a settlement to relieve pressure in the Usambara mountains; in this they appear to have been successful and the second stage of intensive surveys is being planned.

4. Two major schemes and one minor, in the Central and Lake Provinces respectively, were planned with the object of integrating irrigation in various forms with a more general dry farming system. Considerable difficulty was experienced in colonising and developing a small project based entirely on irrigation at Mlali, near Morogoro; the local people were unskilled in the use of water and in the initial levelling of land, and also held very divergent views about planting dates, but once they had been given mechanical assistance in levelling, their whole attitude changed. Construction work in the Uru Chini irrigation area near Moshi was completed and colonization began.

5. In the Geita District of the Lake Province a different approach has been adopted. Small forest reserve areas for fuel and poles are first demarcated on ridge tops and other areas which it is thought advisable to protect; dams for human and animal water supplies are constructed; and then a limited number of families and stock is admitted, but the holdings are not planned. There was again a considerable ingress of population during the year. A similar system is adopted in the Maswa District, but here the numbers of stock got out of control and serious incipient erosion around the dams had to be tackled.

6. The T.A.C. tenant farming projects were extended on all three sites, and again had a successful year. The Corporation will publish a full account of these schemes: they are mentioned here to fill in the overall picture.

7. Among the established land usage schemes, the hills' section of the Usambara plan made remarkable and encouraging progress and the whole area is now covered. It would seem that the lessons of the past have been

learnt and appreciated, for work is now completed on time, and the number of prosecutions for failure to observe the few simple rules was negligible. The following figures speak for themselves:

	1954	1955
Total number of strips of perennial crops planted	27,484 ...	44,920
Acreage of tie-ridging	26,029 ...	41,920

As mentioned previously, the harvesting of wattle bark, the stress on vegetables as a cash crop and a revived interest in coffee planting have all played their part in engendering an atmosphere of enthusiasm. On the plains it is now clear that there is little scope for expansion in the immediate vicinity except on irrigated rice land in the Luengera valley.

8. News of the value of this scheme has spread to the Pare District and at the District Council's request an extremely successful pilot scheme has been started there, to test the application of Usambara methods.

9. The Uluguru Land Usage Scheme was brought to a complete standstill following tribal unrest in June and July. While this unrest was largely of a political nature, some unpopular technical features, coupled with an occasional lack of discrimination in their application, were exploited by the ringleaders to arouse strong opposition to all forms of conservation work. The future of progress with land rehabilitation in this area depends on regaining the confidence of the people. It should be recorded, however, that despite the opposition to organized soil conservation work, some cultivators continue to follow the methods advocated by the scheme, thus indicating that the lessons of the bush schools have been learnt.

10. During the last few years there has been a very rapid expansion of African maize cultivation in the Ismani area near Iringa: this has been largely uncontrolled and little attention has been paid to soil or water conservation. A second dam was constructed to provide household water, and the Native Authority made funds available for a Field Officer to spend his whole time in the area with the object of encouraging a diversification of crops, the introduction of cattle and the planning of the optimum use of the land.

11. Another type of settlement which is now receiving more specialist attention than in the past is that in which the inhabitants of a tsetse-ridden area are encouraged to congregate. These settlements, which are a major feature of the Western Province, have seldom developed far beyond a low subsistence level; cattle could not be introduced, the soils were not exceptionally fertile and therefore shifting cultivation, coupled with a continual battle against regenerating fly-bush, was the order of the day. Better land planning, together with the introduction of cash crops, the use of fertilizers and protective inoculations of cattle, might well open up a new era for these rather depressing outposts.

IX.—MECHANIZATION

1. The place of machinery in the use of land will form part of the work of the new Regional Research Centres. Meanwhile, a machinery experimental unit began work at Malya in the Lake Province in the charge of an Agricultural Officer; tractors and implements were tested for local agents who were well satisfied with the reports made. In addition, two main problems were investigated: the dry season cultivation of hard mbuga soil and the formation of the large ridges which are recommended as standard practice in Sukumaland. Only a summary is presented here, the details being given in Part II.

2. The chief problem on dry mbuga soils is to achieve easy penetration. Some semi-mounted disc ploughs were found to penetrate more easily than mounted ploughs because side draft is reduced. On the other hand, certain heavy-weight disc ploughs, which are simple in design and easy to maintain, penetrate through sheer weight, but they are more expensive both to purchase and to operate. The most promising machine at present, however, is a short mould-board attached to a sub-soiling tyne, an implement which more than any other is likely to make dry season cultivation an economic proposition; it is cheap and easy to maintain.

3. A heavy-duty double-row disc ridger pulled by a 40-50 h.p. wheeled tractor successfully formed two four-foot ridges at once, after the ground had first been ploughed. Unploughed soil can be broken with spring tyne cultivation and the problem now is to see whether both jobs can be done in one operation by the same tractor. It would then be possible to operate more cheaply.

4. The three major tractor ploughing schemes, two run by the Native Authorities with the assistance of the Agricultural Department and one financed by the Lint and Seed Marketing Board, met with varying success.

5. The Native Authority scheme in the Rufiji, which in the past has ploughed 6,000 acres annually for rice production, failed to gain orders for more than 700 acres for the 1956 sowing, when prices were raised to Shs. 60/- per acre for ploughing. The scheme has been put on a care and maintenance basis and will probably be wound up. It has been superseded in part by three ploughing associations formed spontaneously by small groups of enterprising Africans. Each association bought two tractors and ploughs with the fees of Shs. 40/- per acre advanced by their clients, advice on tractor types often being ignored. Altogether 3,200 acres have been ploughed by this means. Such development under sympathetic guidance is probably in the right direction and a Field Officer is therefore receiving special training in order to give these private operators every assistance to make a success of their ventures.

6. The contract ploughing scheme at Malya, financed by the Lint and Seed Marketing Board, was drastically reorganized and operating costs were greatly reduced. It has had a successful year, as the following figures show, and has prospects of becoming a paying proposition.

	Acres ploughed	Total acres cultivated
1954	901 ...	1,004
1955	2,173 ...	2,468

The people have at last appreciated the advantage of aggregating the areas they wish to have ploughed, and by careful planning excessive travelling time was cut and the ploughing season has been spread. The tractors used were Massey Harris 55 and the rate charged was Shs. 45/- per acre.

7. In the Ruvuma valley, the Native Authority scheme only continues because no contractor has yet been found to take it over. About 1,000 acres will be ploughed this season. The machinery is becoming worn out, however, and this target may not be reached. The Tanganyika Agricultural Corporation have agreed to take the scheme over when and if there are at least 3,000 acres to plough, and the local Council will be responsible for seeing that this amount of land is cleared ready for ploughing. The main area is situated below the Newala escarpment and provides an opportunity for the dense population on the hill to expand. Clearing is not heavy, but the water regime is uncertain.

8. Although these Government-sponsored ploughing schemes have not always proved financially successful, they have demonstrated to the peasants the value of mechanical cultivation in areas where the example of non-native estates did not exist. The result is that steadily increasing numbers of Africans are buying tractors of their own, most of which are used for contract ploughing for neighbours as well as on the owner's own land. With this development the need for Government-sponsored schemes should gradually disappear.

Government Food Farm

The Government Food Farm at Lupiro in the Kilombero valley continued to investigate the economics of the full mechanization of rice production. Mechanical handling of this crop at all stages is being studied, including cultivation and harvesting, and a mechanical drier has been installed for the 1956 crop. The results of practical experience on the Farm will be of considerable value in the development of large scale irrigation projects. The farm is now run on a commercial accounting basis. It had a difficult season, but rice yielded on the average sixteen cwts. paddy per acre. Game caused the loss of twenty-five per cent of the crop, while the lack of an ideal variety for mechanization again led to a prolonged and expensive harvest due to excessive lodging. Trials with electric fencing have been planned for next season.

X.—AGRICULTURAL EDUCATION

Important as are barazas and field safaris in furthering agricultural development, the most fundamental extension method of all is to arouse an interest in natural events and basic agricultural principles at primary and middle school level. For some years the syllabus at such schools has included simple instruction and demonstration in agriculture. Results have not always been satisfactory and this aspect of rural education was therefore made the subject of an investigation and report.

2. The three chief difficulties were found to be a lack of trained teachers at all levels, a lack of flexibility in the application of the syllabus under the great variety of conditions in the Territory, and insufficient technical planning and supervision of school farms.

3. The capacity for training agricultural teachers was enlarged by increasing the number of places available at the Agricultural Training Centre at Ukiriguru at the expense of Agricultural Instructors. At the end of the year forty-seven teachers were being trained, compared with twenty last year. In addition, teachers are being trained at the Natural Resources School, Tengeru, and at a small school at Mahiwa, for the Southern Province.

4. The syllabus has been somewhat rearranged, with emphasis in the Middle Schools on a properly organized production farm, run by the senior Standards in the school. The detailed application of the practical side of the syllabus will be decided at District and Provincial level and farms at Middle Schools will be planned by the Agricultural staff. A close supervision of all agricultural activities at schools will receive priority from all field staff of the Department, in close conjunction with their opposite numbers in the Education Department.

5. In the future an increasing number of boys leaving Middle Schools will have to find their living from the land. In order to capture their interest and to train them to become leaders in their own community, the formation of Young

Farmers' Clubs is being actively encouraged, and flourishing Clubs have been started in the Lake and Southern Highlands Provinces. This movement, however, must be guided with restraint, because there is a serious danger that mushroom, ephemeral growth may occur.

6. It is naturally more difficult to educate adults than school-children and results may take a long time to appear. The "Bush School" technique has had a marked success, provided the classes are kept small enough to enable concentrated individual attention to be given. Nevertheless, as a recent survey in another country has shown, imitation of successful farmers is by far the most forceful reason for adopting improved methods, and the "master farmer" approach must therefore be used to the full.

7. While it is very important to increase the number of trained teachers, it is of equal importance that the field instructors should be well grounded both in agriculture and in the techniques of adult education. Instructors are now trained at Tengeru, Ukiriguru and Mahiwa on courses parallel to the teachers' courses, and it is hoped that these institutions will provide a common bond of friendship and co-operation in the field. Tengeru differs from the other two in that students are trained there as soon as they leave school, rather than after a period of experience in the field. The first 3-year course was completed at the end of 1955 and the students are now starting work as Instructors in the field. At Ukiriguru thirty-nine Instructors started the new course in November, the same number as last year.

8. The building of the new Wami Farm School in Morogoro District was started in the latter half of the year. It is planned to provide a strongly practical training in agriculture, with particular emphasis on mechanization, and will be open to all races.

XI.—PRODUCTION COMMITTEES

District Production Committees, as such, came to an end on 31st December, 1955, with the lapsing of the Crops (Increased Production) Ordinance. These Committees did very useful work of a non-statutory nature in addition to their statutory functions; in the Northern Province their place is to be taken by Natural Resources Sub-Committees of the District Advisory Councils, and similar bodies will be formed in the other Provinces. From the nature of the Ordinance under which they were formed, the Production Committees were concerned entirely with non-native agriculture, but the new sub-committees will be multi-racial and will advise Government on all matters which are connected with gaining a livelihood from the soil. I should like to express both my own and my predecessors' grateful thanks to all farmers who have given freely of their time and experience in loyal service to the aims and aspirations of the old committees.

During the year planting orders were issued to cover 43,659 acres of maize and 16,124 acres of wheat, and a sum of £69,825 was paid in guaranteed minimum returns.

XII.—ADMINISTRATION AND LOCAL GOVERNMENT

The organization of agricultural extension services reached a further stage of evolution in the Lake Province. Previously three separate sources provided funds for this purpose. To supplement the routine work of the Department,

the Sukumaland Development Scheme was instituted with Development Reserve funds in the late forties. Then the Lake Province Cotton Committee, financed by the Lint and Seed Marketing Board, was brought into existence, with the specific purpose of expanding the cotton crop by providing more staff and ancillary services. From the 1st July, 1955, the new South-East Lake County Council became responsible for all agricultural extension work, including that on cotton. The Cotton Committee ceased to exist and the Board now provides a substantial portion of the revenue of the County Council. Most of the technical agricultural staff are seconded, but one or two are direct employees. In spite of teething troubles, the Council looks like shouldering its agricultural responsibilities with intelligence and foresight.

2. In the Southern Highlands Province, a "shadow" County Council has been formed, to give members experience of the problems of local government before a Council is created.

XIII.—AGRICULTURAL SHOWS

It is generally agreed that small district shows, with a bias towards agriculture and animal husbandry, are of more value for agricultural teaching than large-scale Trade and Agricultural Shows, with a commercial bias.

2. In the Lake Province, shows of the former type were held at Mwanza, Lubaga (Shinyanga), Maswa and North Mara. A very successful series of demonstrations, also, was held at Nyakatende, near Musoma, in May, and demonstrations of good agricultural practice were given at a gathering arranged by Chief Alex of Usmao (Kwimba).

3. Chief Gwao of Ikungi, in Singida District, staged his small show in July; as usual it was well attended and a great success.

4. In the Western Province, the Nzega annual show on July 25th and 26th was a great success. The number and quality of exhibits was good, and the show was well attended. Several commercial firms had stands, and the tractors and their ancillary equipment attracted popular attention. The ever-popular ox-ploughing competition was again won by the same lady as last year. There was a small show at Kasulu on June 17th, at which the quantity and quality of the produce shown, though an improvement on the year before, were still disappointing.

5. In the Northern Province, the Moshi District Agricultural Show took place on October 7th and 8th and was attended by some 10,000 people. There was a most attractive Departmental stand, and the exhibit on the Sudan dioch and its control, in particular, was favourably commented on by many people.

XIV.—FISHERIES

For the Fisheries Section of the Department, 1955 was largely a year of reorganization and re-framing of policy. At no time was the establishment of four Fisheries Officers up to strength and, with the retirement of one officer and the vacation leave of another, only two officers were on duty in the Territory for the first three quarters of the year.

2. In July, the senior of the Fisheries Officers was appointed to Headquarters to reorganize the programme, to direct and co-ordinate all work in the field, to advise me on fisheries matters and to represent the Territory on inter-territorial committees.

3. The fisheries policy of the Territory is based on the rational exploitation of the natural resources of the sea and inland waters, the development of new fish resources by the stocking of dams and other water impoundments, and the planned production of fish in ponds. Whilst advice and assistance continue to be given wherever applicable, it is considered that there is little scope at present for the establishment of economically sound fisheries requiring considerable capital resources and the use of large-scale fishing methods. The greatest hopes for development lie in fostering the expansion of the existing native fisheries by practical assistance to the fishermen, by the introduction of new or improved fishing techniques including the use of small mechanized craft and by the opening up of new markets for fishery products.

Marine Fisheries.—The Marine Fisheries programme had been based almost entirely on the use of the 50-foot M.F.V. *Patoni.* This vessel was equipped for a variety of fishing methods, but with the emphasis on trawling, and was fitted with a refrigerated hold. It was intended that *Patoni* would operate mainly in offshore waters and would ascertain whether fishing with a vessel of this type could be a profitable concern for commercial enterprise. Early this year it became apparent that if *Patoni* were to put in sufficient time at sea to justify her high operational costs, a new main engine would be needed. The whole scheme was reviewed and the decision was taken to wind up this project and to dispose of the *Patoni.* It may be said that, in addition to the necessity of cutting costs and diverting the effort of the Marine Fisheries Section into more promising channels, the decision to discontinue this project was in part based on information now coming forward from the East African Fisheries Research Organization, Zanzibar, on the lack of prospects for trawling and other large-scale fishing methods on the East African coast. Deep-water fish are only to be found in quantity in a few exceptional areas, and even when good catches are made they are difficult to market at an economic price. Furthermore, in Tanganyika, maintenance facilities for vessels of this type are quite inadequate.

Experience with *Patoni,* as with another *M.F.V.* on Lake Tanganyika, has shown that the commissioning, operation and maintenance of such vessels under the conditions prevailing in this Territory occupy a disproportionate amount of a Fisheries Officer's time. The end is apt to be lost sight of in the anxiety to keep such vessels seaworthy and at sea. Some other aspects of extension work must suffer and there is a real danger of losing touch with the native fishing industry.

The new Marine Fisheries programme is based on work with the existing native inshore fisheries, which appear capable of considerable expansion and development. Mechanization is one of the greatest single factors likely to lead to increased productivity and provision has been made for the purchase of a small powered inshore fishing vessel of a type that can be operated and maintained by African fishermen themselves.

An essential preliminary to development is a detailed survey along the entire coastline, designed to assess the volume, value and diversity of the inshore fisheries, to indicate the most pressing problems of the industry and the fields in which there is the greatest scope for the introduction of improvements and to reveal the most suitable area for more concentrated extension work.

A newly-appointed Marine Fisheries Officer was posted to Mtwara in August and by the end of the year had completed a most comprehensive survey of the fisheries of the entire Southern Province coastline from the Ruvuma to Mohoro Bay.

As a result of inquiries from various parties interested in the export of seaweed, concessions for its collection along various areas of the coast were granted during the year by tender. So far, there have been few signs of activity on the part of the concessionaires. It is mainly the red seaweed used for agar-agar production which is of interest.

Inland Fisheries.

Owing to the staff position, it was not possible to man the Inland Fisheries Office at Kigoma during 1955, and it was on a care and maintenance basis under the Field Officer (Agriculture), who continued the collection of statistics for the *dagaa* industry.

2. The fisheries vessel *Sangala*, which had given good service on Lake Tanganyika and had largely completed the task allotted to her, was sold in October.

3. The Lake Tanganyika *dagaa* fishery enjoyed another prosperous year. Known sales through Kigoma merchants totalled 1,138 tons of dried dagaa valued at £160,000, of which 412 tons, of an average value of £150 per ton, were exported to ports in Belgian territory against hard currency. It is estimated that 150 tons were exported from ports in the Ufipa District to Northern Rhodesia. Exports to Belgian territory do not include the unknown quantities taken by road to Ruanda Urundi, nor the amounts taken by individual fishermen to Belgian lake ports, thereby avoiding the payment of the Native Authority cess. This latter activity is flourishing, assisted by the greatly increased sales of outboard engines to African fishermen. Calculated on a fresh weight basis, the overall catch of *dagaa* from the Tanganyika waters of the lake was not less than 7,000 tons.

4. With poor rains and a consequent drop in the lake level, and the usual problem of vegetation encroaching on the fishing beaches, the *Tilapia* fisheries of Lake Rukwa had a difficult year, and the heavy exports of smoked fish made to Northern Rhodesia in 1954 were not repeated. The industry also suffered a setback with the destruction by fire of many of the smoke-houses during the year. The Lake Rukwa Fisheries Board considerably reduced its activities and there are no reliable statistics of production for the year.

Fish Farming.—The Departmental fish farming station at Korogwe was manned throughout the year. Considerable repair work to the ponds was necessary, owing to damage caused by flooding and the growth of tree roots in the bunds. The repair work afforded an opportunity to raise the fertility on some pond bottoms which have now been in continuous use for six years.

2. The main function of the Korogwe station has been the selection and breeding of certain species of *Tilapia* for the distribution of fry throughout the Territory. In addition stocks are maintained of the Cichlid *Astartereochromis* which is used for the control of the snail vectors of schistosomiasis in certain waters. The catfish *Clarias* also shows promise as a stock fish for certain areas.

3. It has been discovered that one of the species of *Tilapia* in use can be readily sexed at an early stage by visual means, and experiments are now in progress with "monosex culture", which entails the selection and stocking of males only. In most species of *Tilapia* the males have a faster growth rate than the females, and if it is possible to stock with males only there are great hopes of obtaining larger individual fish, as well as of overcoming the "runting" and overstocking which are the greatest problem with *Tilapia* populations in confined waters.

4. A review of fish farming activities in Tanganyika reveals that there is little prospect in the foreseeable future of the widespread establishment of fish ponds *per se* on an economic basis. Not only is there an absence or unreliability of perennial water supplies over the greater part of the Territory, but there is an almost complete absence of the Far Eastern type of peasant holding on which fish farming can form an integral part of the intense mixed farming practised. There has been some enthusiasm amongst European settlers in the highland areas of abundant water supply for the construction of ponds exclusively for fish production, but unfortunately, in most of these areas, conditions of climate, soil and water have proved unsuitable for the successful culture of *Tilapia*. This problem might be susceptible of solution by experiment, but on economic grounds it is usually not possible at present to advise the construction of fish ponds for profit.

5. The emphasis is now shifting away from the fish pond as such towards the stocking and controlled management of dams and other water impoundments. In all such cases the water has been impounded primarily for other purposes, and if crops of fish can be produced from it then this is a valuable additional dividend, gained without expenditure on special construction. In addition to their value as a food crop, the fish themselves can play a useful role in dam management, by keeping down the weeds which assist silting and provide cover for mosquito breeding, and by direct feeding on mosquito larvæ, snails, etc. All types of water impoundment are suitable for stocking with some fish or other and, where annual stocking with a quick-growing fish (possibly selected males only) is possible, a crop can be obtained even from waters which vanish in the dry season. There have been several outstanding successes, largely a reflection of the amount of attention that the dam owners have been able to give to regular cropping and management. A 200-acre dam on a sisal estate in the Tanga Province is now yielding 2,000 lb. of good-sized *Tilapia* per month, and could probably yield more, but that fishing is geared to giving the entire labour force a fish ration once a week. The management of fish populations in dams presents some problems, more especially of effective methods of reaping the crop and preventing overstocking, and work on these problems is now in hand.

XV.—LEGISLATION

(A) Ordinances:

Cotton: in June, 1955, Cap. 270 was repealed and replaced by a revised Cotton Ordinance, more in keeping with present conditions.

The Crops (Unlawful Possession) Ordinance came into effect on the 4th November, 1955, and gave special powers to farm owners to arrest persons found in possession of farm produce in suspicious circumstances. This measure will only be applied to specific areas and/or specific crops by order from time to time.

The Land Bank (Amendment) Ordinance of 1953 came into effect in October, 1955.

The Crops (Increased Production) Ordinance was not re-enacted, and therefore lapsed on the 31st December, 1955.

(B) Rules, Regulations and Orders:

Coffee: The Coffee Industry (Registration and Improvement) (Application) Order, 1955, declared that Part III of the Ordinance, in regard to licensing, should not apply to Bukoba District nor to Kimwani Chiefdom in Biharamulo District.

Seeds: Amended Rules under the Export Seeds Ordinance defined the conditions under which a seed grower may be registered.

Castor seed: Rules were made under the Markets Ordinance, confining the trade in castor to a section of markets set aside for the purpose.

Native Authorities Ordinance: Provision has been made during the year for the making of rules under section 9 of this Ordinance, as follows:

(1) In Tanga Province and in the Geita and Ukerewe Districts of the Lake Province, to control banana weevil in particular.

(2) In Chunya District, to control pig and other vermin.

(3) In the Southern Highlands Province, to control white stem borer and *Antestia* in coffee.

(4) In Mbeya District, to control the movements of residents so as to prevent soil erosion on the Mbeya Range.

(5) To regulate wattle cultivation in any part of the Territory.

The Water Hyacinth (*Eichhornia crassipes*) was declared to be a pest under the Plant Protection Ordinance.

XVI.—STAFF

The Director, Mr. J. R. P. Soper, and the Deputy Director, Mr. A. P. S. Forbes, were in charge of the Department during the year. Dr. A. C. Evans was appointed to the new post of Assistant Director of Agriculture (Research). Dr. E. A. Riley was appointed Plant Pathologist, Lyamungu. Mr. D. G. Jones, Agricultural Officer, was promoted Assistant Director of Agriculture.

The Department was sorry to lose Dr. G. B. Wallace, O.B.E., Plant Pathologist, Mrs. M. M. Wallace, Temporary Research Assistant, and Mr. J. K. Robertson, Senior Agricultural Officer, all of whom retired after long and valuable service.

Two promising young Agricultural Officers resigned during the year, seven new ones arrived and were under training at the end of the year. Four Field Officers left the Department, one was re-appointed as Headmaster of Wami Farm School and eight new Field Officers arrived, leaving eleven vacancies unfilled.

There are also single unfilled vacancies for a Plant Pathologist, an Entomologist, a Fisheries Officer, an Assistant Agricultural Officer and a Farm Manager.

In addition to the normal establishment, the Department benefits from the work of Mr. J. E. Peat, Chief Scientific Officer of the Empire Cotton Growing Corporation and the four officers under him.

Staff as on 31st December, 1955:

The following figures do not include officers on leave pending resignation, retirement or completion of agreement.

1	Director
1	Deputy Director
1	Assistant Director (Research)
4	Assistant Directors
2	Senior Research Officers
2	Entomologists
2	Plant Pathologists
1	Plant Physiologist
3	Botanists
41	Senior Agricultural Officers and Agricultural Officers
3	Fisheries Officers
1	Zoologist
1	Horticulturist
1	Education Officer (seconded from Education Department)
1	Chemist (seconded from Government Chemist's Department)
1	Treasury Accountant (seconded from Accountant-General's Department)
1	Secretary (seconded Agricultural Officer)
1	Headmaster
6	Senior Field Officers
2	Tobacco Officers
2	Ginnery Officers
84	Field Officers (Agriculture)
6	Assistant Agricultural Officers
1	Executive Officer, Production Committee
1	Research Assistant
6	Agricultural Foremen
1	Office Superintendent
1	Junior Field Officer (Agriculture)
5	Stenographers
1	Mechanic
103	Clerks
1	Master
2	Chemical Assistants
7	Coffee Grading Assistants
100	Recorders
8	Artisans
1,227	Instructors
25	Instructors (Copra)
4	Laboratory Assistants

12 Junior Farm Bailiffs
21 Overseers
12 Instructors (Fisheries)
10 Motor and Tractor Drivers
155 Subordinate Staff
1 Junior Technical Instructor
1 Telephone Operator.

XVII.—PUBLICATIONS

The Cotton Red Bollworm Problem in Southern Tanganyika.

G. Swaine, A. C. Evans, J. B. Ward.
(*East African Agricultural Journal*, XX. 3. 183)

The Bark Diseases of Coffee, M. M. Wallace.
(*East African Agricultural Journal*, XXI. 1.)

Sudden Death Disease of Cashew Trees in Tanganyika.

G. B. Wallace and M. M. Wallace.
(*East African Agricultural Journal*, XXI. 1.)

Twenty-first Annual Report of the Coffee Research and Experimental Station, Lyamungu, for 1954/55 Season.
(Departmental Pamphlet No. 61)

The White Coffee Borer—how to fight it.

A pamphlet issued by the Entomologist, published by the Coffee Board of Tanganyika.

In addition, the following publications have been printed early in 1956 by the Government Printer:

Report on the Possible Extension of Tea Cultivation in Tanganyika by T. Eden, D.Sc., F.R.I.C.

Report on an Enquiry into Agricultural Education at Primary and Middle Schools, issued by the Department.

XVIII.—CONCLUSION

In conclusion, I should like to express my appreciation of the loyal and unstinting way in which the staff at all levels have supported me, and in particular of the inspiration which has been displayed in tackling problems of ever-increasing complexity. My thanks are also due to those members of the public who have rendered valuable voluntary service on various boards and committees connected with the work of the Department.

J. R. P. Soper,
Director of Agriculture

MONTHLY RAINFALL IN INCHES FOR SEASON 1954/55 AND YEAR 1955 AT PROVINCIAL STATIONS

	Eastern Province Morogoro		Central Province Dodoma		Western Province Tabora		Lake Province Mwanza		Southern Highlands Province Mbeya		Northern Province Arusha		Tanga Province Lushoto		Southern Province Lindi*	
	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.
October, 1954 ...	2·13	0·94	0·00	0·19	0·03	0·59	0·19	1·90	0·04	0·59	0·10	1·21	1·83	1·42	0·42	0·67
November, 1954 ...	0·29	2·09	0·00	1·11	1·73	3·95	2·57	4·56	0·78	2·23	1·10	3·55	1·43	3·90	1·18	2·02
December, 1954 ...	2·69	2·81	4·35	3.35	8·34	6·68	7·47	5·71	7·33	5·26	4·94	4·31	3·81	4·28	1·96	5·85
January, 1955 ...	0·36	3·86	1·76	5·23	4·33	5·00	2·07	3·75	5·52	7·51	1·10	1·81	2·63	2·97	4·36	5·89
February, 1955 ..	8·40	3·81	8·30	3·51	5·43	4·86	6·26	4·14	7·97	6·28	5·93	2·84	7·77	2·86	18·78	4·50
March, 1955... ...	2·37	6·83	4·30	4·74	4·23	6·60	3·32	6·09	3·87	6·27	4·30	6·38	2·79	5·63	7·59	6·21
April, 1955	6·83	8·12	0·21	1·85	4·35	5·43	8·00	5·71	7·90	4·48	11·27	13·81	4·01	8·90	5·11	7·56
May, 1955	6·00	3·94	0·28	0·18	1·76	1·12	3·24	3·74	1·46	0·71	2·79	7·50	8·80	7·35	1·65	1·50
June, 1955	1·33	1·06	0·00	0·06	0·00	0·11	0·00	0·77	0·27	0·04	1·84	1·02	3·90	2·05	1·81	0·34
July, 1955	0·56	0·55	0·00	0·00	0·00	0·00	0·70	0·53	0·00	0·03	0·27	0·44	1·14	1·41	0·79	0·31
August, 1955 ..	0·00	0·38	0·00	0·00	0·00	0·04	0·49	0·72	0·00	0·05	0·00	0·58	0·40	0·87	0·03	0·22
September, 1955 ...	0·84	0·64	0·00	0·00	0·54	0·28	1·06	1·78	0·00	0·11	0·00	0·66	0·00	0·67	0·00	0·57
Total for season	31·80	35·03	19·2	20·22	30·74	34·66	35·37	39·46	35·14	33·56	33·64	43·11	38·51	42·31	43.68	35·64
October, 1955 ...	0·13	0·97	0·00	0·19	0·00	0·58	0·19	1·84	0·00	0·56	0·08	1·15	0·51	1·43	0·54	0·65
November, 1955 .	2·91	2·04	0·03	1·11	1·39	3·90	2·45	4·49	1·62	2·17	0·80	3·43	4·45	3·85	1·31	1·97
December, 1955 ...	3·48	2·81	5·99	3·35	6·98	6·71	6·52	5·77	5·87	5·35	7·03	3·34	3·91	4·26	1·16	5·62
Total for year, 1955	33·21	35·01	20·87	20·22	29·01	34·63	34·30	39·39	34·48	33·56	35·41	43·96	40·31	42·25	43·13	35·34

*(No complete record available for Mtwara).

CROP PRODUCTION FIGURES

(A) MAJOR CROPS

Sisal

Year	Production in tons	Export in tons	Value of Export in £
1951	145,223 ...	142,106 ...	23,689,454
1952	162,185 ...	156,167 ...	21,708,053
1953	168,763 ...	171,151 ...	12,773,839
1954	178,250 ...	167,642 ...	10,902,109
1955	176,499 ...	173,676 ...	9,956,151

COFFEE

(a) *Mild Coffees*

Province	Area	Tons of Parchment 1953/54	1954/55
Northern ...	K.N.C.U. ...		5,447
	Warusha	8,091 ...	140
	Wameru		
	Estates (Non-native) ...	1,852 ...	2,688
Southern Highlands ...	Rungwe	551 ...	950
	Mbeya/Mbozi (Native)	219 ...	149
	Mbeya/Mbozi (Estates)	209 (+75 buni)	178 (+75 buni)
	Lupembe	5 ...	15
Southern ...	Songea	288 ...	478
Tanga ...	Pare	101 ...	126
	Lushoto	113 ...	183
	Non-native	43 ...	101
	Totals ...	11,472 ...	10,455

COFFEE

(b) *Hard Coffees*

Province:	Tons of clean coffee 1953/54	1954/55
Lake	7,230 ...	8,627
Tanga	33 ...	30
Eastern	55 ...	51
	7,318 ...	8,708

COTTON

Production in Bales of 400 lb.

Province	1951	1952	1953	1954	1955 (Estimate)
Lake ...	42,349 ...	70,298 ...	38,600 ...	90,859 ...	107,650
Eastern ...	3,047 ...	6,723 ...	9,927 ...	8,966 ...	8,490
Northern	1,970 ...	562 ...	1,864 ...	2,191 ..	2,700
Tanga				364 ..	1,450
Southern ...	145 ...	179 ...	247 ...	258 ...	127
	47,511 ...	77,763 ...	50,638 ...	102,638 ...	120,417

Cashew Nuts

Tons of nuts sold through local markets

Province	1951	1952	1953	1954	1955
Southern	5,308	9,064	8,768	11,500	13,233
Eastern	1,073	1,745	1,297	1,658	1,799
	6,381	10,809	10,065	13,158	15,032

Cassava

Tons sold through local markets

Province	1951	1952	1953	1954	1955
Southern	8,894	26,000	8,044	4,297	8,786
Eastern	112	127	236	487	245
Central	31	—	606	20	18
Western	2,340	3,150	3,423	4,243	5,935
Lake	17	—	—	37	10
	11,394	29,277	12,309	9,084	14,994

Coconuts

Tons of Copra

Province	1951	1952	1953	1954	1955
Southern	1,076	824	419	495	552
Tanga	3,518	4,081	5,821	4,794	5,486
Eastern	3,991	9,988	5,856	7,299	4,955
	8,585	14,893	12,096	12,588	10,993

Maize

Tons delivered to Grain Storage Department

Province	1954	1955	
Southern Highlands	13,399	27,175	
Northern	17,173	36,249	
Southern	4,550	5,631*	(including T.A.C. production)
Western	10,032	12,402	
Eastern	6,271	20,950	
Central	562	964	
Tanga	1,050	8,440	
Lake	4,429	10,125	
	57,466	94,512	

Oil Seeds

(a) *Groundnuts*

Tons sold through local markets

Province	1951	1952	1953	1954	1955
Lake	1,051	2,199	20	843	827
Central	1,183	2,590	388	654	550
Western	1,301	5,461	389	1,131	3,122
Southern	900	632	406	1,480	3,985
Southern Highlands	–	–	–	–	79
	5,525	10,882	1,183	4,108	8,563

(b) *Sesame*

Tons sold through local markets

Province	1951	1952	1953	1954	1955
Southern	3,145	1,549	1,286	2,490	4,138
Eastern	279	286	229	184	299
Lake	37	64	3	33	36
Central	–	–	–	–	43
	3,461	1,899	1,518	2,707	4,516

(c) *Sunflower*

Tons of seed sold through local markets

Province	1951	1952	1953	1954	1955
Southern Highlands	800	960	160	355	289
Central	149	265	80	155	104
Western	1,172	6,028	446	1,512	5,311
Eastern	816	1,303	568	658	603
Northern	1,237	738	420	594	968
Southern	605	1,042	176	508	539
Lake	495	1,777	316	677	2,423
Tanga	350	179	216	93	109
	5,624	12,292	2,382	4,552	10,346

PULSES

(including yellow peas, chickpea, soya, mixed beans, cowpea, gram, pigeon pea, bambarra nuts.)

Province	1951	1952	1953	1954	1955
Southern	1,833	4,652	1,076	2,237	2,700
Central	176	160	15	31	73
Western	2,061	1,991	867	1,754	2,680
Lake	7,346	6,977	4,137	6,890	4,472
Southern Highlands	2,132	2,630	1,189	1,210	1,064
Eastern	635	613	752	688	565
Northern	10,177	3,728	4,297	4,022	*1,398
Tanga	–	–	–	–	618
	24,360	20,751	12,333	16,732	13,570

(*excluding haricot beans, 1,358 tons.)

PYRETHRUM

Tons of dried flowers

Province	1951	1952	1953	1954	1955
Northern	136	107	125	360	379
Southern Highlands	165	133	150	175	234
Total	301	240	275	535	613

RICE

Tons of Paddy

Province	1951	1952	1953	1954	1955
Eastern	9,305	2,823	6,657	9,841	14,172
Central	23	–	–	–	48
Southern Highlands	1,336	3,000	5,769	6,890	6,042
Southern	2,755	1,392	662	1,215	2,276
Western	2,037	2,250	630	1,640	2,962
Lake	4,502	5,185	1,300	4,620	3,712
Northern	188	51	61	74	84
Tanga	1,806	938	1,750	2,321	2,783
	21,952	15,639	16,629	16,601	32,059

Seed Beans

	1950/51	1951/52	1952/53	1953/54	1954/55
Tons exported	1,173	1,251	1,460	1,894	2,110

Tea

Manufactured tea in lb.

Province	1952	1953	1954	1955
Southern Highlands	2,462,601	2,821,245	3,583,655	3,303,666
Tanga				1,217,449
Total				4,521,115

Tobacco

(a) *Flue-cured*

Cured leaf in lb.

Province	1951	1952	1953	1954	1955
Southern Highlands	2,736,190	2,290,087	1,995,325	3,269,407	2,909,890
Western	40,320	77,045	188,480	228,863	291,165
Southern	—	—	22,400	73,920	185,920
	2,776,510	2,367,132	2,206,205	3,572,190	3,386,975

(b) *Fire-cured*

Cured leaf in lb.

Area	1951	1952	1953	1954	1955
Songea	1,352,960	896,000	542,080	1,516,489	982,240
Nyamirembe	470,400	420,120	309,120	400,960	361,312
	1,823,360	1,316,120	851,200	1,917,440	1,343,582

Wattle

1955

Province	District	Acreage	Production (tons)
Southern Highlands	Iringa:		
	Dabaga	1,500	
	Sao Hill	2,000	
			180
	Njombe:		
	(native)	2,021	
	(C.D.C.)	33,000	
Northern	Moshi	—	295
Tanga	Western Usambaras	2,538	4,154
			4,629

Wheat

Tons sold through organized markets

Province	1951	1952	1953	1954	1955
Northern	4,902	4,465	4,301	9,320	3,722
Southern Highlands	380	246	66	100	80
Southern	542	553	600	350	303
Western	11	–	7	–	28
Eastern	–	–	–	–	51
	5,835	5,264	4,924	9,770	4,183

(B) Minor Crops

Onions, in tons

Province	1951	1952	1953	1954	1955
Northern	1,265	1,763	1,460	1,603	2,297
Eastern	174	134	157	70	61
Central	924	261	200	317	160
Lake	38	2	–	250	8
Western	–	–	–	–	17
Southern	–	–	–	–	16
Southern Highlands	–	–	–	–	195
	2,401	2,160	1,817	2,240	2,754

Gums

(Arabic and Copal), in tons

Province	1951	1952	1953	1954	1955
Central	85	58	97	193	157
Western	228	206	375	397	426
Lake	245	148	232	256	402
	558	412	602	846	985

Kapok, in tons

Province	1951	1952	1953	1954	1955
Tanga	191	167	320	110	337
Eastern	135	276	420	424	216
Southern	–	–	–	45	62
	326	443	740	579	615

EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1951—1955

	Maximum Export prior to 1955		1951	1952	1953	1954	1955	Export value, 1955
			Amount	Amount	Amount	Amount	Amount	
	Year	Tons	Tons	Tons	Tons	Tons	Tons	£
Sisal	1953	171,151	142,106	156,167	171,151	167,642	173,676	9,956,151
Cotton lint	1953	14,749	8,315	11,105	14,749	12,111	20,374	5,533,909
Coffee	1954	19,382	16,565	18,619	15,239	19,382	18,499	6,904,717
Barley	1954	293	—	88	—	293	452	9,582
Beans and Pulses	1952	23,184	10,638	23,184	10,551	10,432	8,279	522,665
Beans, Soya	1953	674	—	—	674	522	567	21,036
Cashew nuts	1954	16,298	8,165	11,506	11,358	16,298	18,202	868,534
Castor seed	1952	12,345	7,570	12,345	11,754	9,609	7,870	309,881
Cassava	1952	15,177	6,342	15,177	561	1,714	2,486	39,903
Copra	1928	9,318	—	5,505	1,083	2,046	4,723	259,720
Fats	1948	1,689	123	79	69	91	83	5,315
Gum, Arabic	1950	2,319	1,689	564	1,346	1,534	2,125	206,850
Gum, Copal	1950	110	99	11	38	58	70	5,218
Groundnuts	1936	22,786	3,499	9,435	1,088	2,503	5,586	345,522
Kapok	1953	838	381	468	838	581	872	215,974
Maize	1952	8,353	559	8,353	234	—	35,835	746,569
Millet and Sorghum	1928	7,732	4,137	2,767	1,958	17	13,150	287,491
Onions	1948	2,418	446	187	187	872	151	5,210
Palm kernels	1954	674	334	374	578	674	386	15,680
Papain	1948	130	18	43	83	103	37	46,059
Pyrethrum	1945	697	149	156	155	136	275	79,708
Rice	1938	17,965	151	343	3	72	1,247	55,129
Rubber	1944	1,314	20	2	—	—	—	—
Sesame	1938	5,241	22	496	343	3,108	4,207	292,541
Sugar	1941	5,454	5	10	1	2	—	—
Sunflower seed	1952	17,708	9,512	17,708	6,180	10,202	12,506	377,468
Tea	1954	1,566	821	1,011	1,122	1,566	1,689	535,166
Tobacco	1948	1,421	781	641	333	350	448	88,618
Vegetable Oils	1940	2,268	130	685	1,063	723	61	7,145
Wattle bark	1954	2,122	1,318	979	2,009	2,122	4,837	109,291
Wheat	1945	4,511	—	—	—	10	—	—
Essential oils	1950	9	6	3	3	2	3	4,725
Total	—	—	223,901	298,011	254,751	264,775	338,696	£27,795,777